CRCOG Northwest Corridor Study
Downtown Circulation Task

Steering Committee Meeting

October 20, 2008, 10:30 AM

TranSystems

Agenda

1. Welcome and Introductions
2. Overview of Study Objectives and Existing Conditions
3. Review of Possible Transit Center Sites and Alternatives
4. Initial Evaluation of Transit Center Sites and Alternatives
5. Discussion and Input Regarding Evaluation and Findings
6. Next Steps

1. Study Goals

- Understand current and future transit ridership:
  - to, through, within downtown
- Develop comprehensive downtown circulation plan
- Increase transit ridership with improved downtown circulation plan
- Evaluate suitability of downtown transit center
  - Evaluate alternate locations
- Improve downtown transit service in a cost-effective manner

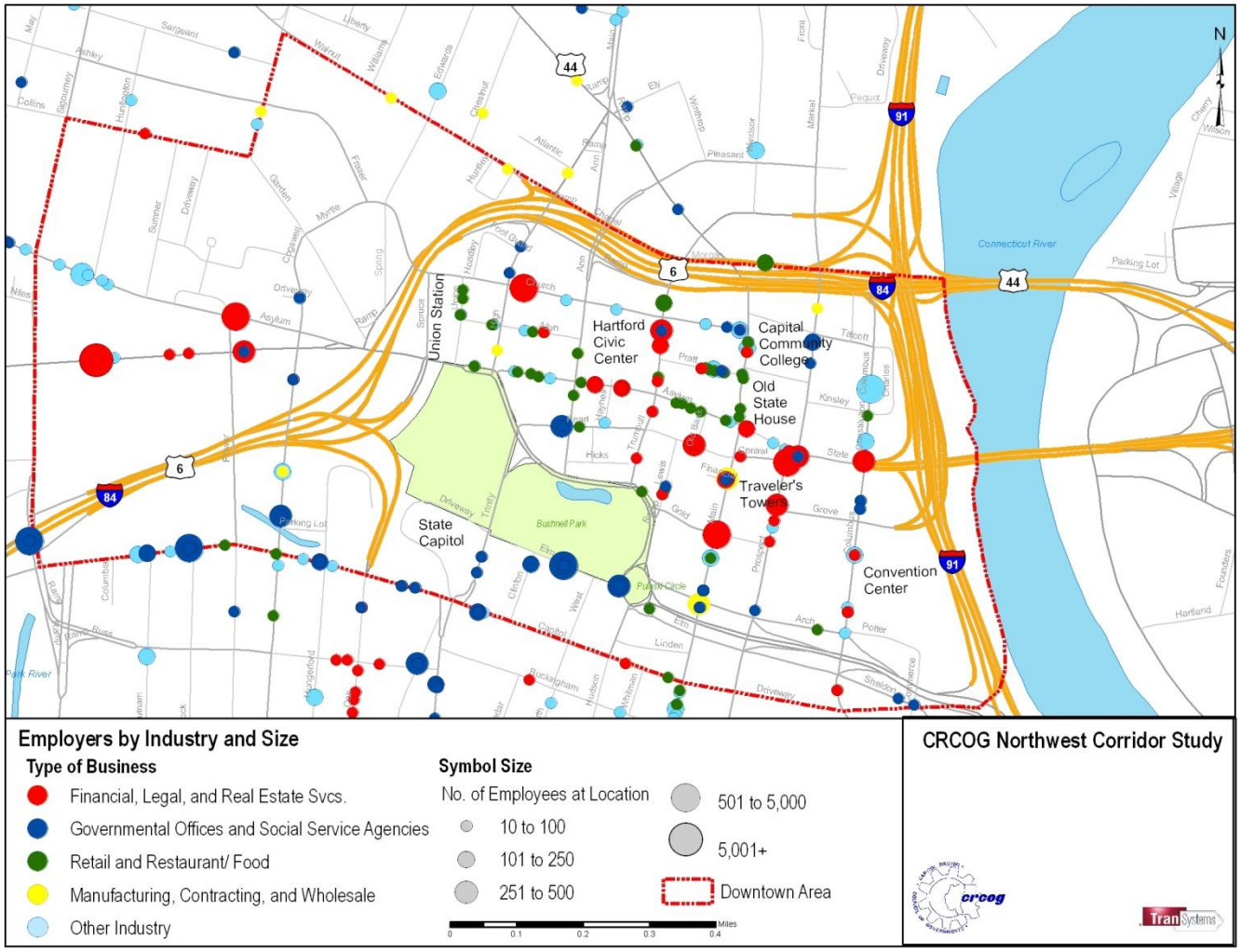
1. Existing and Future Conditions

- Current downtown transit services
  - Through routes
  - Terminating routes
- Current downtown ridership:
  - Where are riders destined?
  - How many transfer
  - What are the key downtown connections and destinations
- Future busway routes, ridership, and transfers

  - **What works, what doesn't?**
  - **Could a transit center help?**

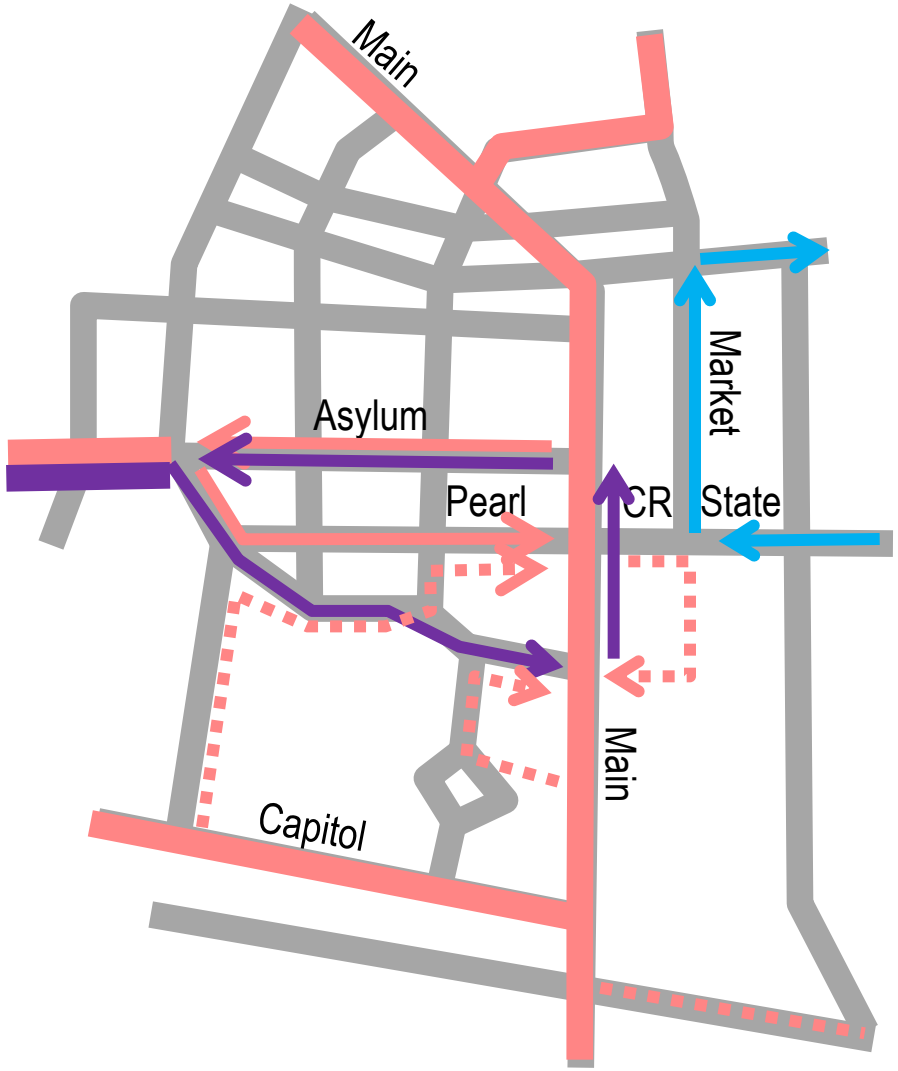
Downtown Study Area

Downtown Employers by Industry



Source: Info USA

Current Service



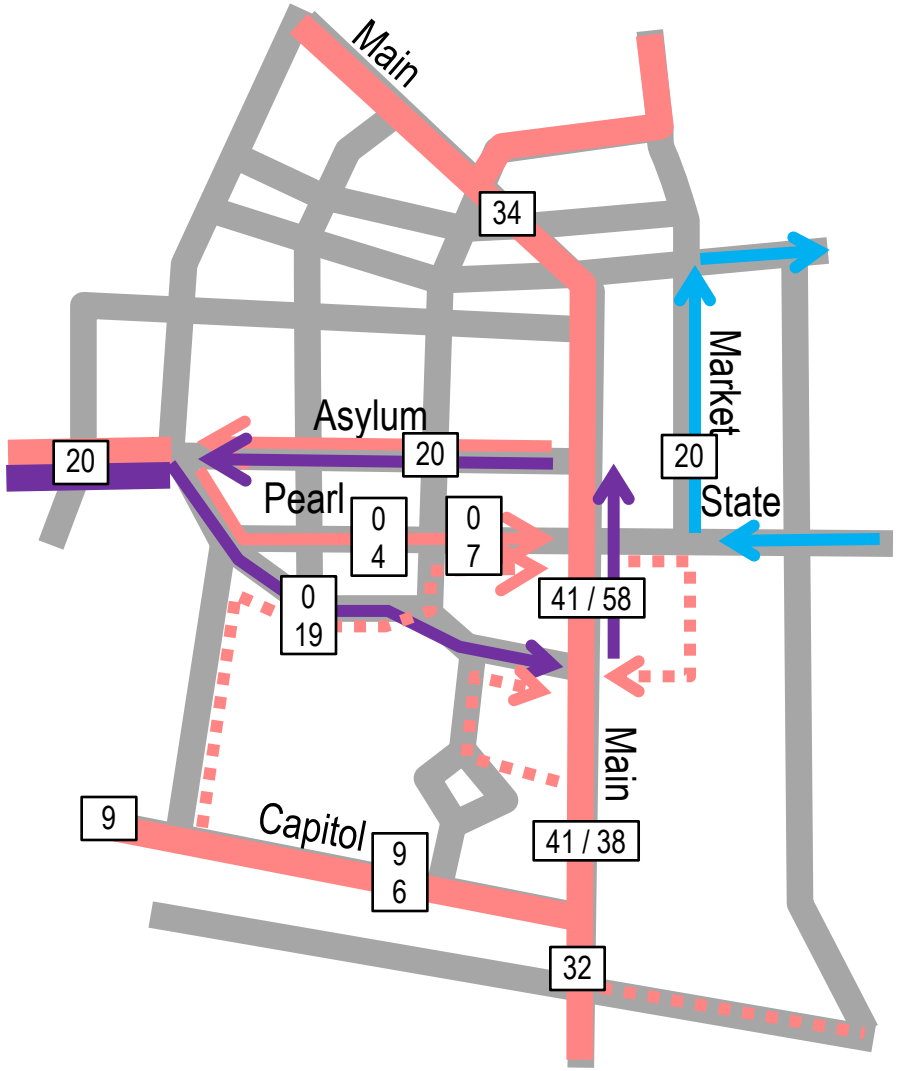
North-South Through Routes
(A, K, N, Q, T, U, W)

North or South Terminating Routes
(S, F2, G, P)

East Terminating Routes
(B, H, J, O, Y, YM, Z)

West Terminating Routes
(E, F1, S)

Current Service – Peak Hour Local Bus Volumes



North-South Through Routes

North or South Terminating Routes

East Terminating Routes

West Terminating Routes

00
00

Peak Hour Local Bus Volumes
(for each side of the street)

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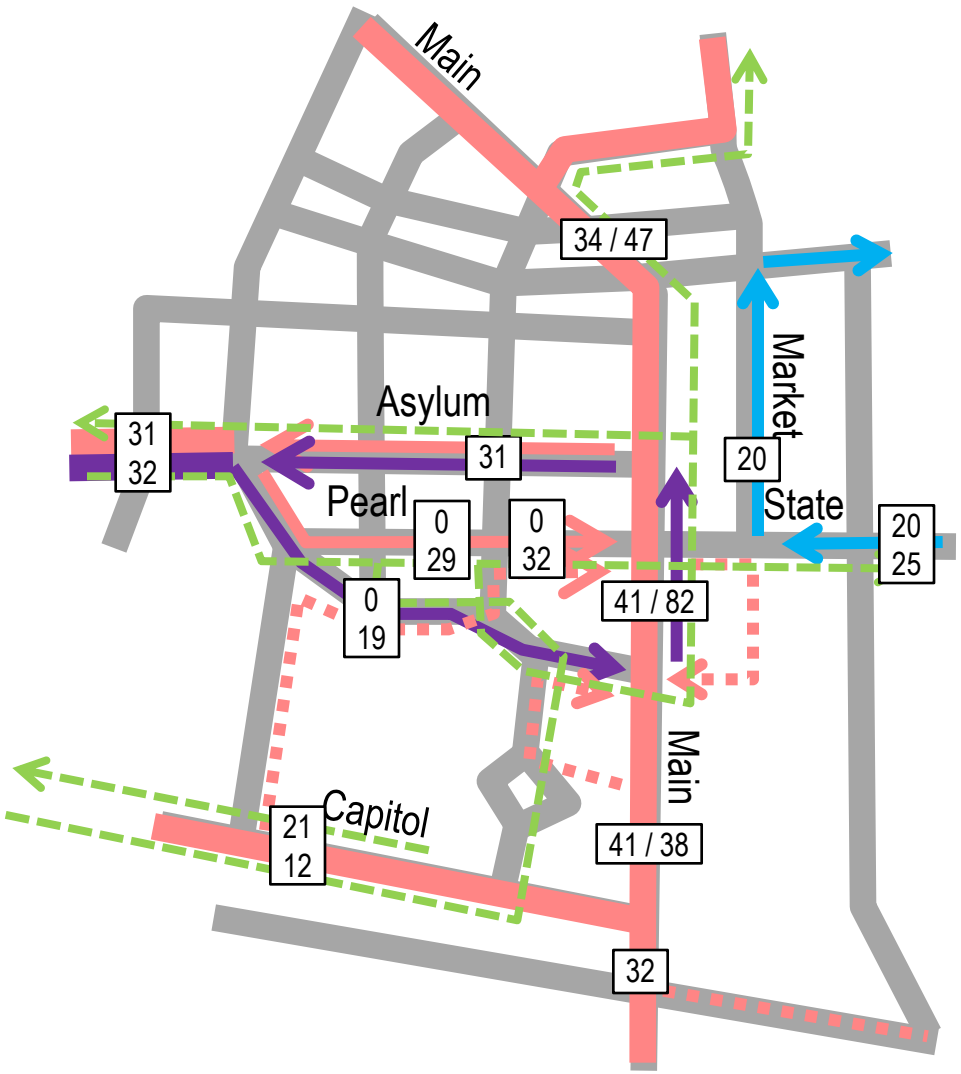
Current Service – Peak Hour Local and Commuter Bus Volumes



North-South Through Routes

North or South Terminating Routes

East Terminating Routes

West Terminating Routes

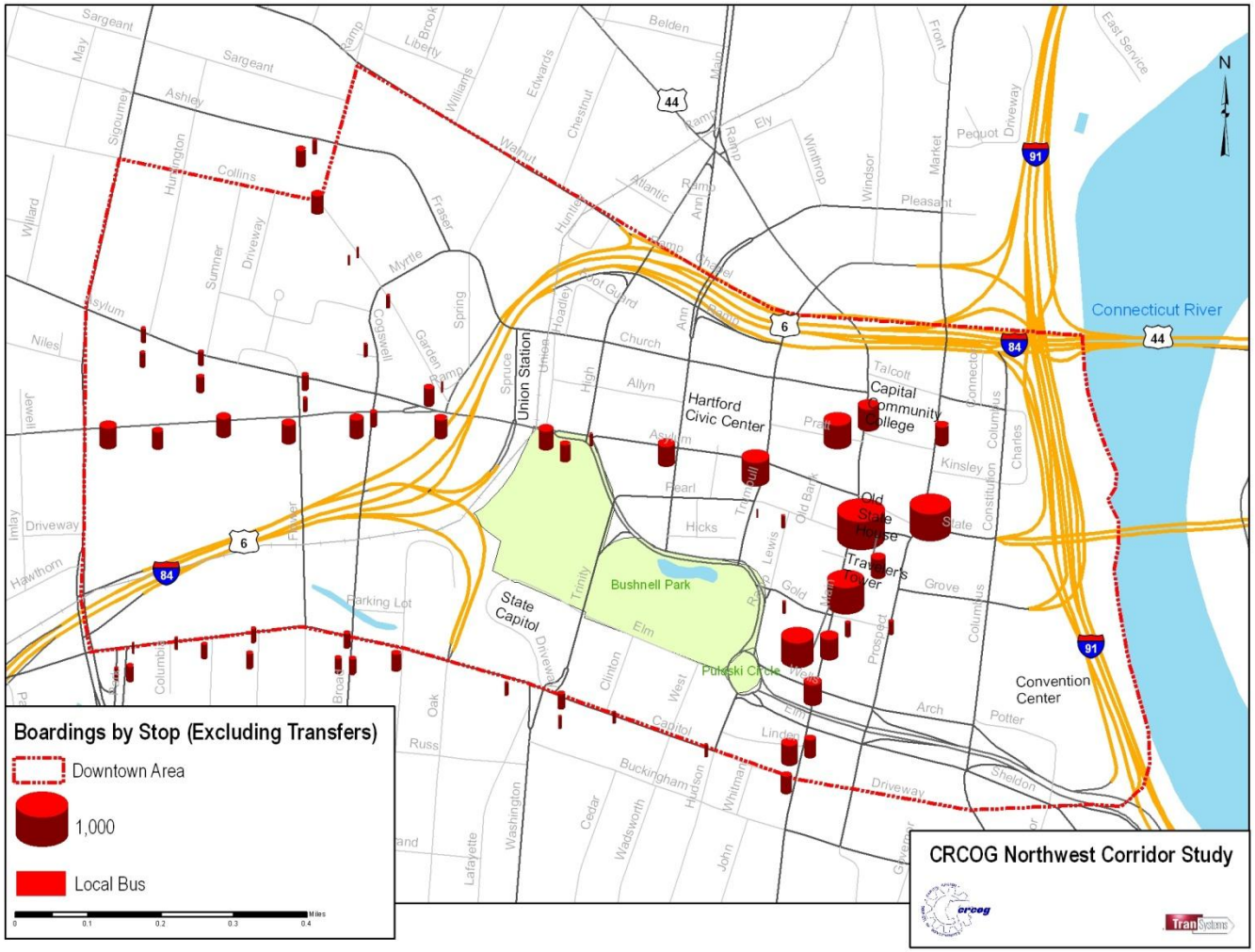
PM Commuter Routes

00
00

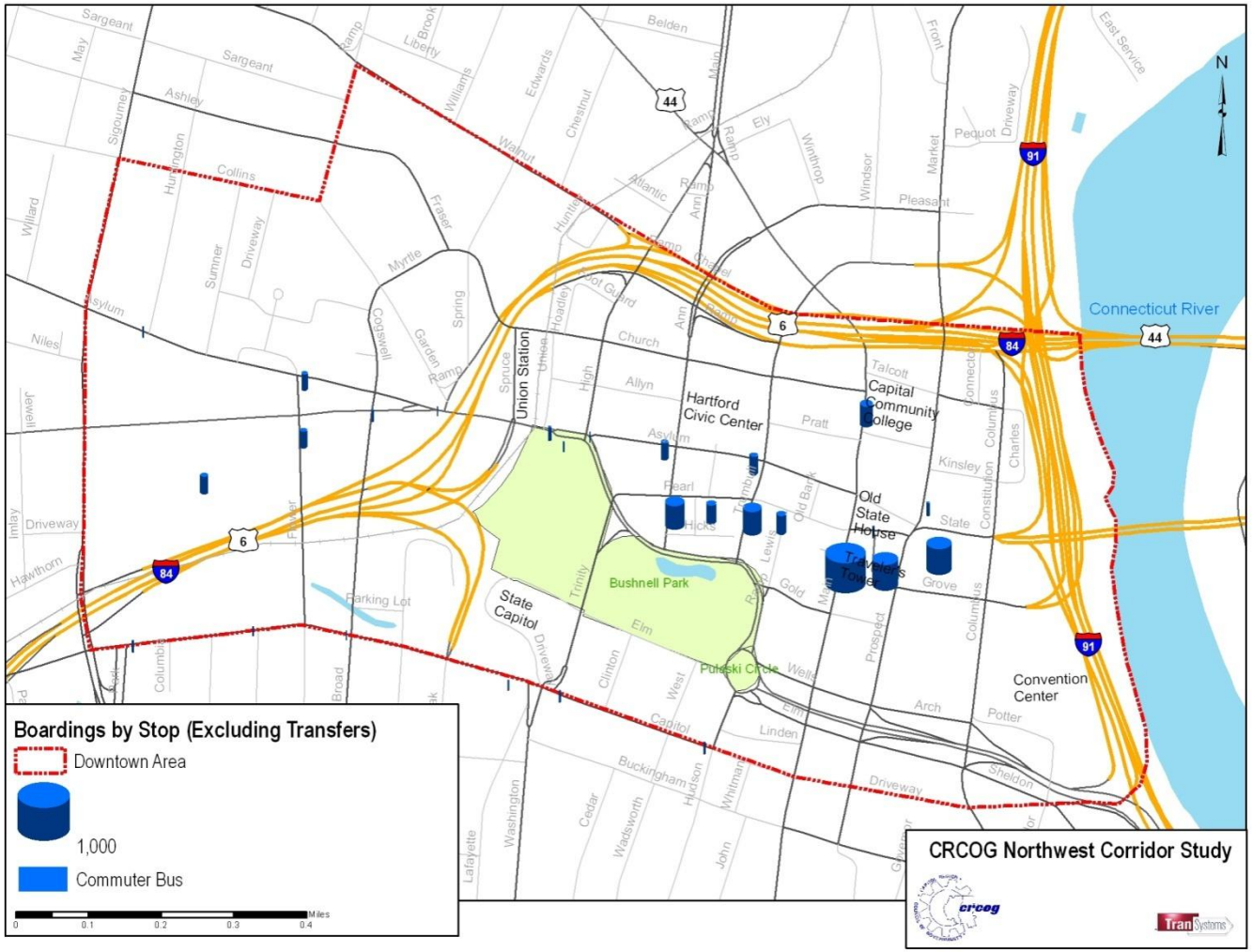
PM Peak Hour Bus Volumes
(for each side of the street)

TranSystems

Downtown Local Bus Origins



Downtown Commuter Bus Origins



Downtown Transfers

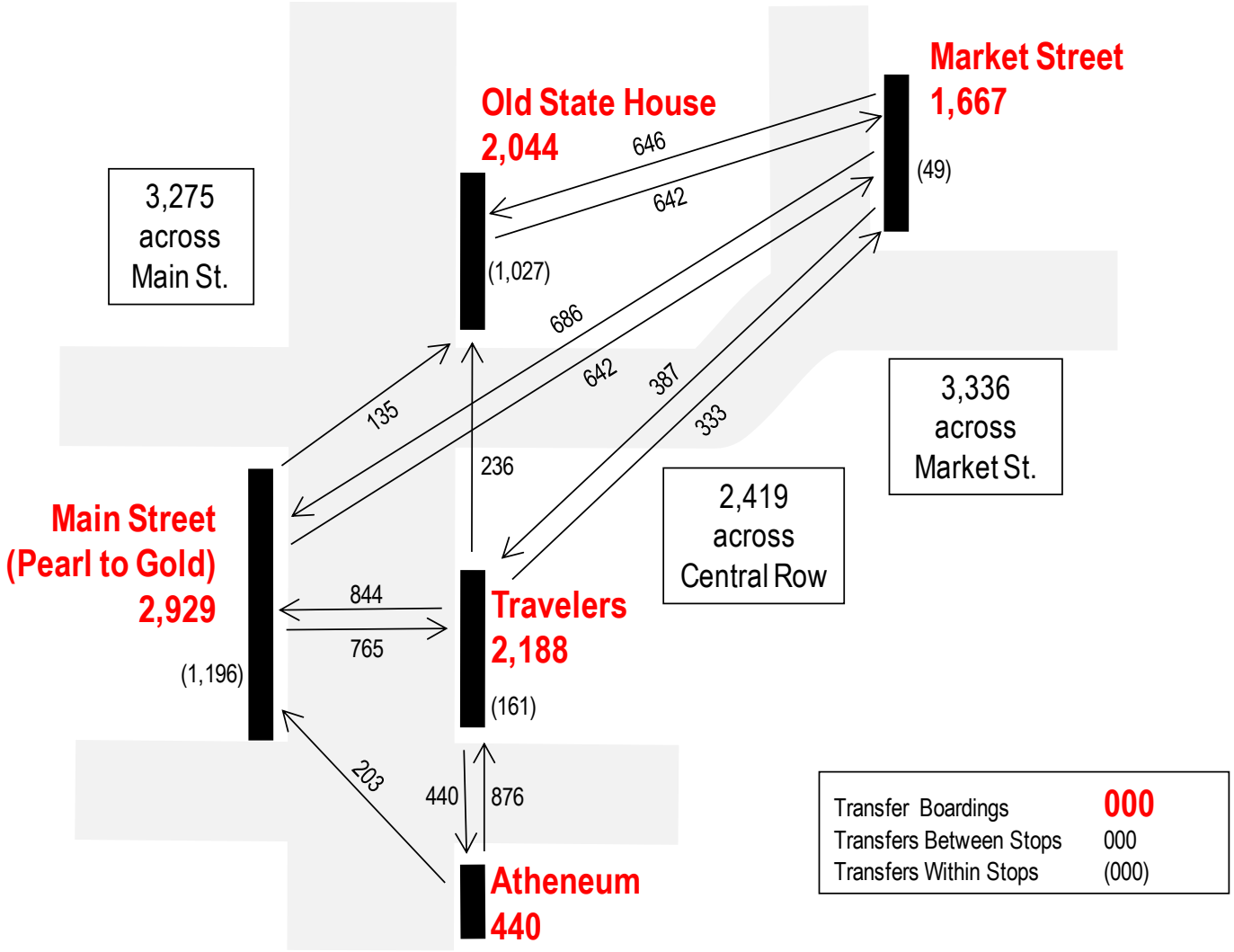
- Est. 16,900 daily local bus boardings in the study area
- 14,774 at just a few stops on Main, Market and Central Row

- Est.11,238 daily transfers to local buses in and around downtown
- 10,326 on Main, Market and Central Row

- 70% of Main Street area local bus boardings are transfers
- There are also about 1,280 through riders on seven through routes

- Only about 9% of commuter bus boardings are transfers

Daily Estimated Downtown Local Bus Transfer Movements



Findings: Through routes

- Many more riders transfer than travel through
- Major through routes (A, K, Q, T) seem to make sense
- Some through routes (N, U and W) have few through riders
- Through-routing helps keep operating costs down
  - No need for overlap between north and south routes
  - No need to turn buses around on side streets in the downtown

Findings: Terminating Routes

- Terminating routes could be through-routed without rider disruption
- Possible pairings
  - routes from the south (P, G and F2)
    - Most transfers with north-south through routes and E Farmington
  - Terminating routes from the west (E, F Ashley and S Granby)
    - Most transfers with north-south through routes
    - Highest transfers to non-through routes are to Z Tolland Turnpike and B Silver Lane (east of the river)
  - East of the river routes
    - B Silver Lane and Z Tolland Turnpike have most transfers with E

- **Some potential for east-west connection**

Busway Service and Transfer Assumptions

- 29 peak hour buses
  - Local and busway only (19)
    - 3,000 daily riders destined to downtown
    - Assume same transfer rate as local bus routes (~70%)
    - Assume riders will transfer to other routes like K, P, Q, and W riders
    - Approx. 2,000 transfers to and 2,000 transfers from busway services
    - Routes should make transfer connections like local bus routes
  - Express commute (10)
    - From Bristol, Cheshire, Meriden and Waterbury
    - Assume riders will transfer like commuter bus riders (almost none)
    - Should serve downtown like commuter routes and serve Asylum Hill

Findings: Key Downtown Nodes and Connections

Nodes

- Main Street remains an important destination
  - Main Street/Asylum is centroid of downtown employment
- Other important nodes:
  - Asylum Hill employers
  - Capitol Ave. Government offices
  - Downtown residential
  - Entertainment district/Union Station area
  - Convention Center Area

Findings: Key Downtown Nodes and Connections

Connections

- Maintain north-south through connections
- Serve connections from north and south to the west
- Serve connections from the east to all corridors
- Maintain commuter services to the downtown
- Maintain Star Shuttle service for visitor market
- Provide connections from Union Station to downtown and Asylum Hill
- Provide connections to convention center area
- Provide a pathway for busway vehicles - Union Station to Main St.

Findings: What a Transit Center Can Do

- Provide a better environment for transferring passengers
  - Safe – no need to cross street
  - Dry – more shelters and/or a waiting room
  - Convenient – rest rooms and concessions
  - Informative - Schedule and bus arrival information
- Move waiting passengers away from downtown businesses
  - Improved perception of downtown area
- Eliminate bus layover time on downtown streets
  - No more vehicles idling on streets
  - Less on-street space needed to accommodate buses
- Provide a better quality of service
  - More layover space available to improve on-time performance

3. Identification of Transit Center Sites

Identification of Possible Transit Center Sites

- Four general locations are possible
  - On Main Street north of Church and south of Pleasant
  - On Main Between Church and Gold (if available)
  - On or near Main Street between Gold and Park
  - In the Union Station area

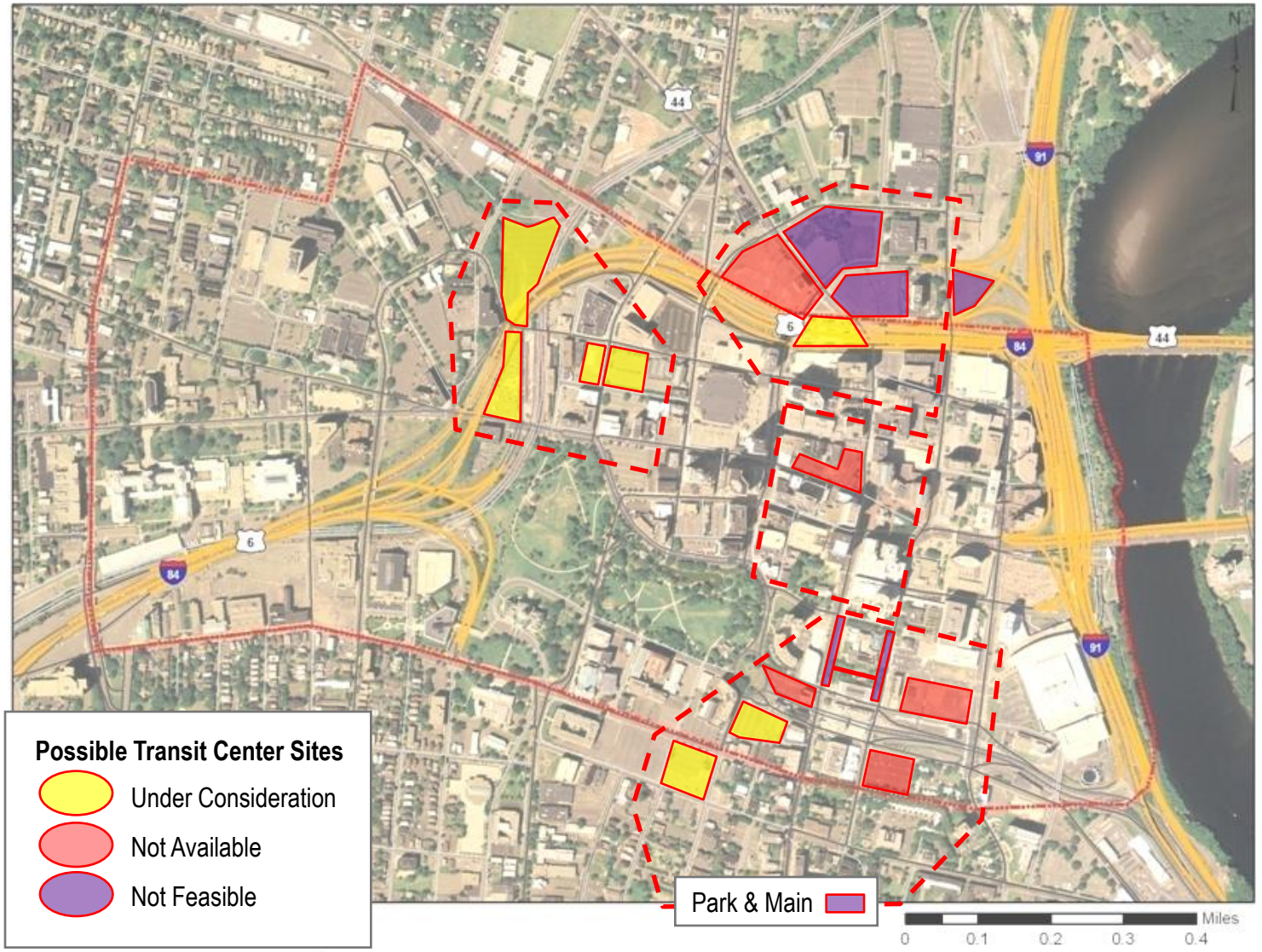
- Sources for identifying sites
  - Aerial photos of downtown
  - Suggestions from Steering Committee
  - Available land
  - Surface parking areas

Screening of Transit Center Sites

- Site availability
  - Reviewed sites with Hartford Planning Division
  - Eliminated those not available

- Site feasibility
  - Reviewed likely external bus circulation at each site
  - Considered internal bus circulation options at each site
  - Site topography

Possible Transit Center Sites



Strategy for Improving Downtown Service

- Maintain stop on all routes at or near the central area of Main St
- Provide a transit center
- Improve transfer connections/amenities for transfers outside the transit center
- Minimize the number of transfers at unimproved facilities
- Reduce the overall number of transfers with through-routing
- Expand service to the west side of downtown as well as Union Station
- Consider expansion of service east of Main Street to developments along Columbus Boulevard

Downtown Circulation Alternatives

- **Alternative 1** - Maintain the north-south orientation of bus service and develop a transit center somewhere along the Main Street corridor

- **Alternative 2** - Enhance service to the west side of downtown by developing a transit center at or near Union Station that would be served by most routes while maintaining a secondary hub near Main Street

Additional Downtown Circulation Alternatives

- **Alternative 3** – Spread bus layovers among three smaller transit centers with each route serving two of the centers so that all transfer connections can be made

- **Alternative 4** – Minimize added travel time and mileage by maintaining a centrally located transfer point and developing an on-street transit center east of Main Street

4. Through-Routing Options Considered within Each Alternative

A. Through-route only those existing through-routes with substantial through ridership; all other routes follow the same route in both directions (serving the Main Street area, terminating at the transit center and returning via the Main Street area)

B. Through-route the same routes as in A; all other routes terminate downtown following one-way loops that serve both Main Street and the transit center

C. Through-route as many routes as possible

Potential Changes to Through-Routing

- Existing through-routing
  - Maintain K, T, and Q through-routing and preferably A
  - No need to maintain N, U and W through-routing
- Possible new through-routing
  - New combinations must have same frequency of service
  - E with B, Z and YM together
  - H or J with G or W (south side)
  - S (north side) with S (south side) at all times
  - F2 with O, B or N (north side)
  - F1 with W (north side)

Through-Routing Evaluation

- Maximum through-routing eliminates only 300 transfers (<3%)
- Through-routing can substantially reduce downtown bus volumes and reduce operating costs
- Through-routing can make a non-centrally-located transit center more efficient

- *Each alternative was therefore evaluated assuming a maximum through-routed operation*

Advantages of All Alternatives

- All Alternatives…
  - Include improved transfer facilities
  - Move a sizeable majority of transfers into a Transit Center
  - Have all routes serving a transit center
  - Have all routes serving a downtown stop on or near Main Street
  - Minimize the number of transfers across the street
  - Minimize bus volumes through increased through-routing

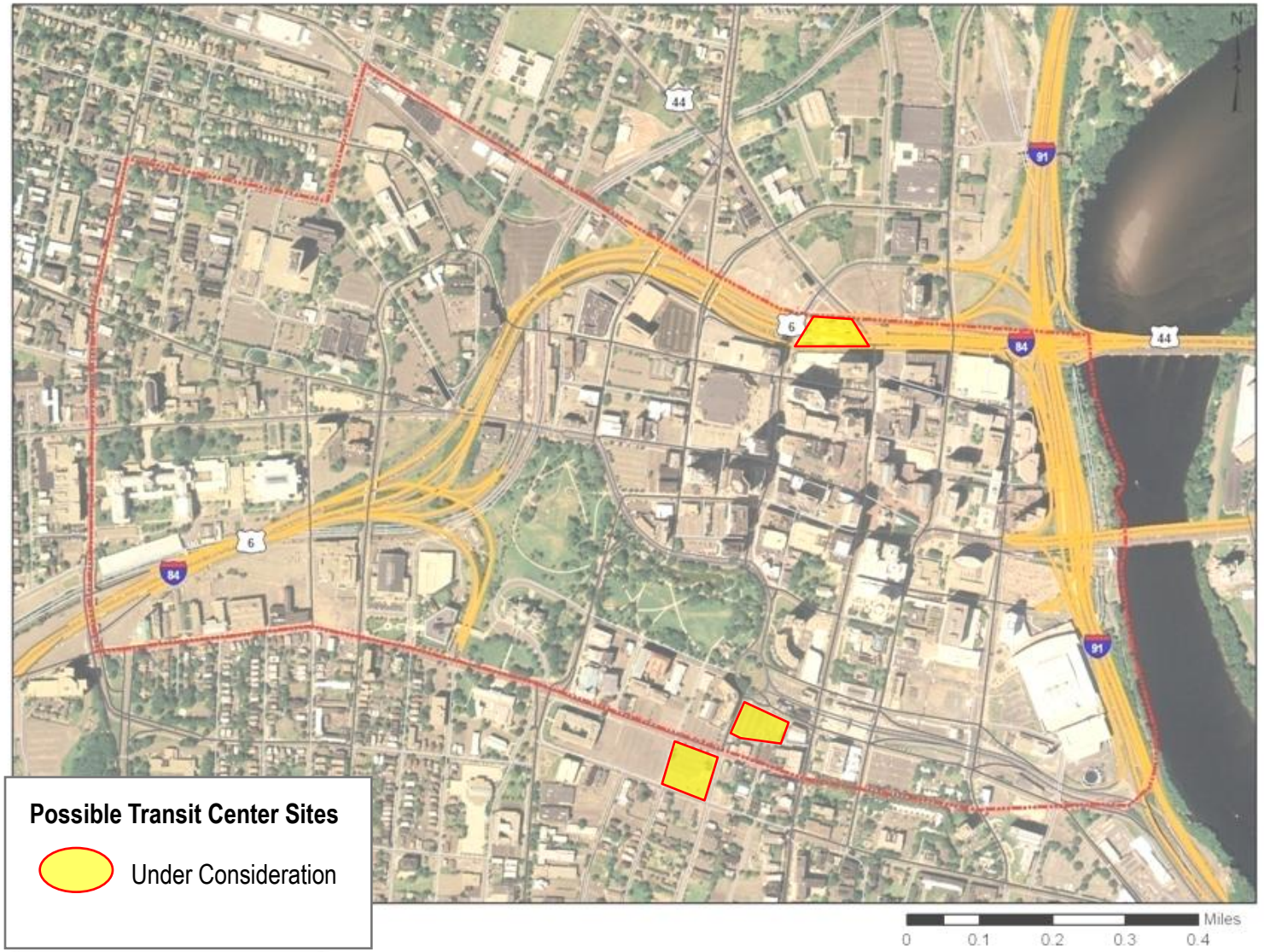
Evaluation of Alternatives (modified criteria)

- Utilization of Transit Centers
  - reduction in on-street and cross-street transfers
- Service to Through and Transferring Riders
  - Transfer convenience and directness
- Service to Riders into Downtown
  - travel time and diversions
- Service to Riders Traveling within Downtown
- Traffic Circulation Changes Needed
- Operating Costs
  - Added cost of route extensions/modifications
  - Savings from increased through-routing
- Capital Cost
  - Transit Centers
  - Roadway changes

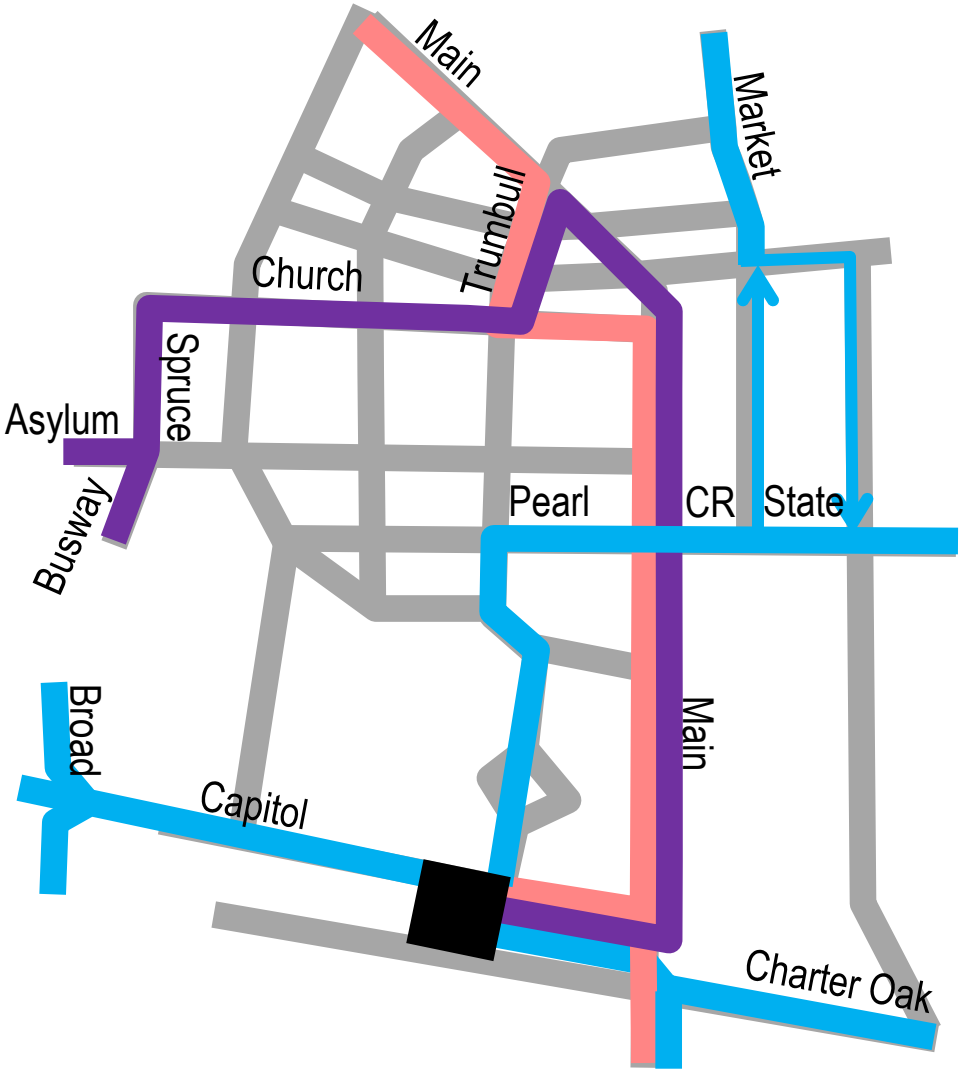
Alternative 1

- **Alternative 1** - Maintain the north-south orientation of bus service and develop a transit center somewhere along the Main Street corridor

Alternative 1 - Possible Transit Center Sites



Alternative 1 – Through Routing



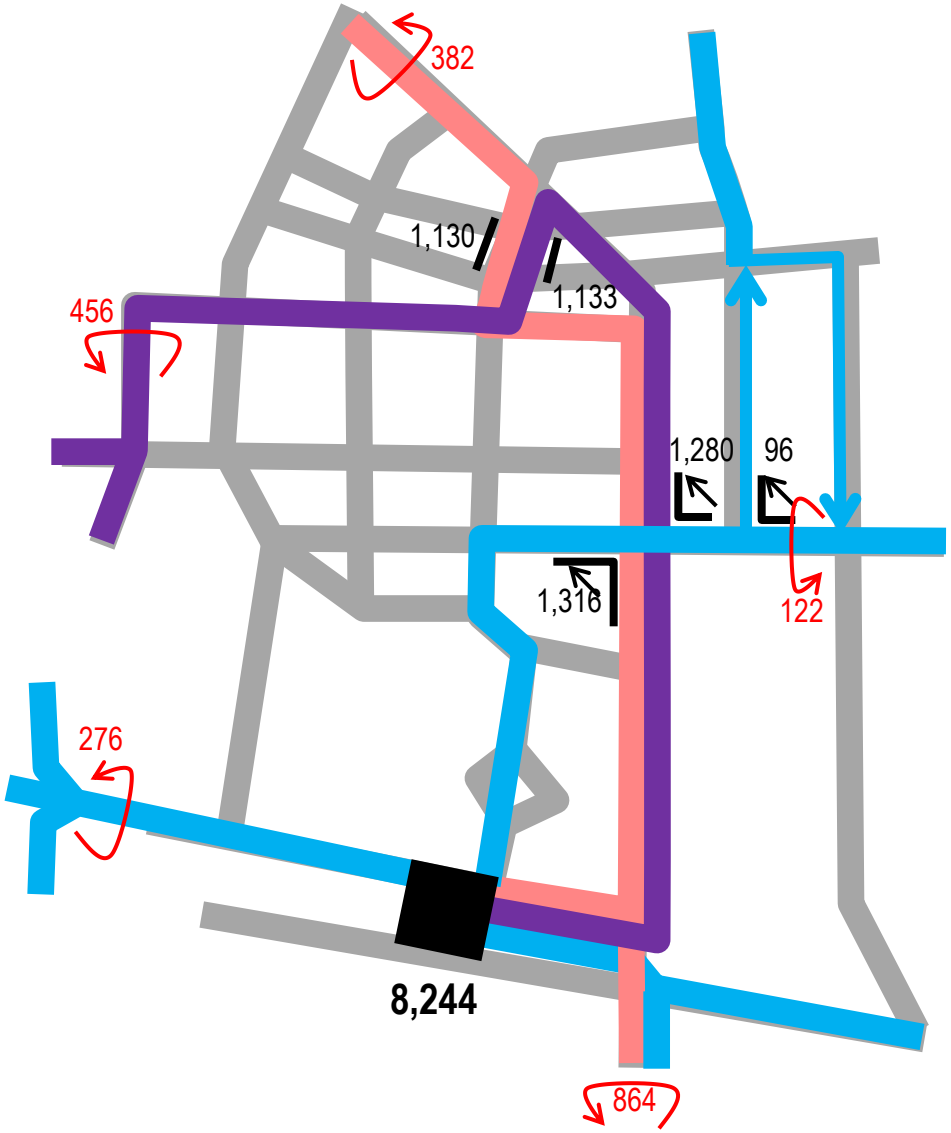
North-South Through Routes
K, Q, T, U

East-Southwest Routes
AA + O
AH + YM
F1 + WNM
F2 + B
G + H
NC + Z
WV + J
SW + SG (north-west)
YS (terminating)
NW (terminating)
P (terminating)

West Terminating Routes
E
Busway

Transit Center

Alternative 1 – Daily Transfer Volumes



North-South Through Routes

East-Southwest Routes

West Routes

Daily Transfers

000 Crossing Streets

000 Without Crossing

000 Transit Center Transfers

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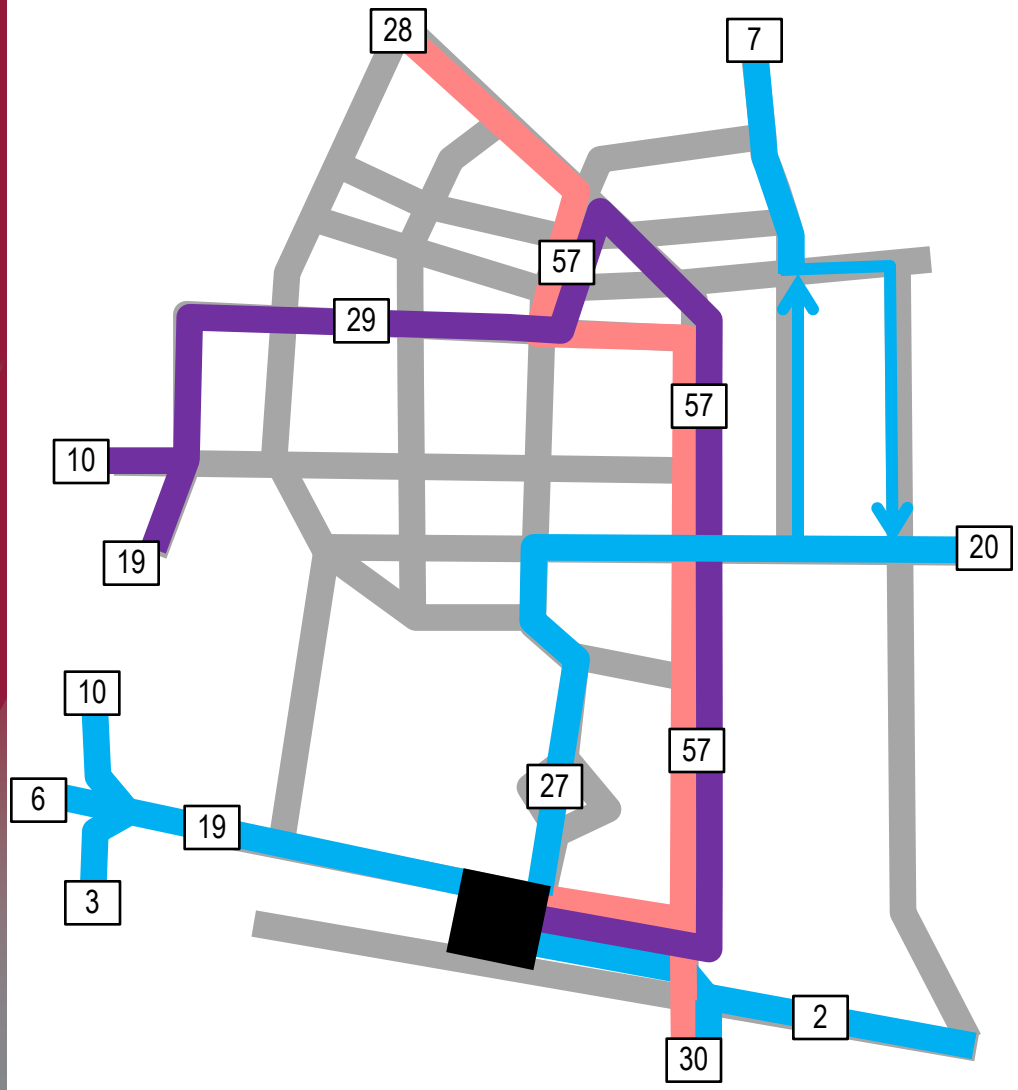
Alternative 1 – Peak Hour Local Bus Volumes



North-South Through Routes

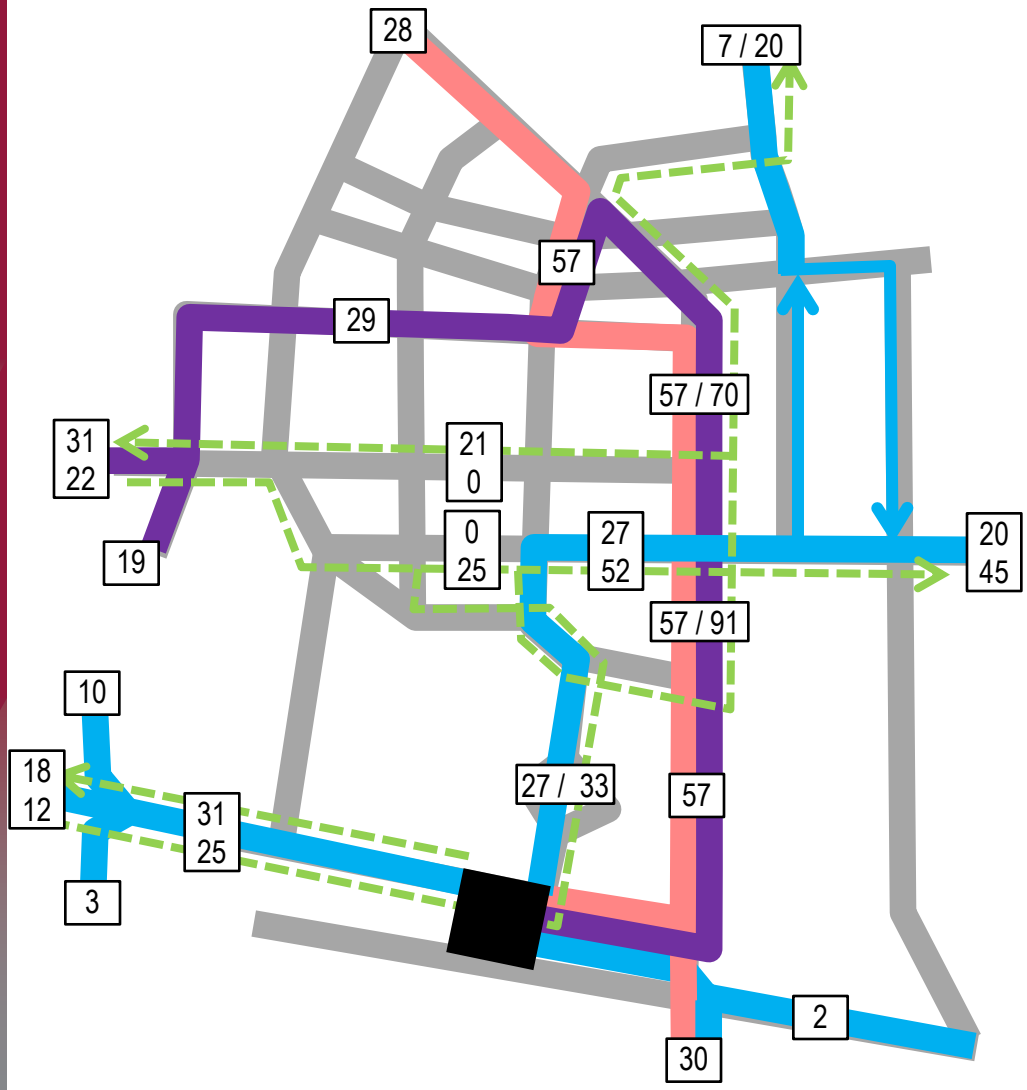
East-Southwest Routes

West Routes

00 Peak Hour Local Bus Volumes (each side of the street)

TranSystems

Alternative 1 – Peak Hour Local and Commuter Bus Volumes



North-South Through Routes

East-Southwest Routes

West Routes

PM Commuter Routes
(including busway express)

00
00

PM Peak Hour Bus Volumes
(for each side of the street)

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Alternative 1 – Transit Center Needs

- Access
  - Most buses would need to enter and exit from Main Street
    - via Linden/Elm for Konover Site
    - via Capitol and/or Buckingham for Capitol Ave. site
  - Some would enter/exit from Capitol and/or Hudson

- Capacity
  - 135 local buses (including busway) in peak hour
  - 11-16 bays for local service (most through-routed)
  - 3 bays for busway (terminus for eight routes)
  - Assuming no commuter buses or busway express

Alternative 1 – Initial Evaluation

Advantages

- Large available transit center site
- Easy bus access to/from transit center sites
- Increased access to the the east side
- Increased access to the Capitol area

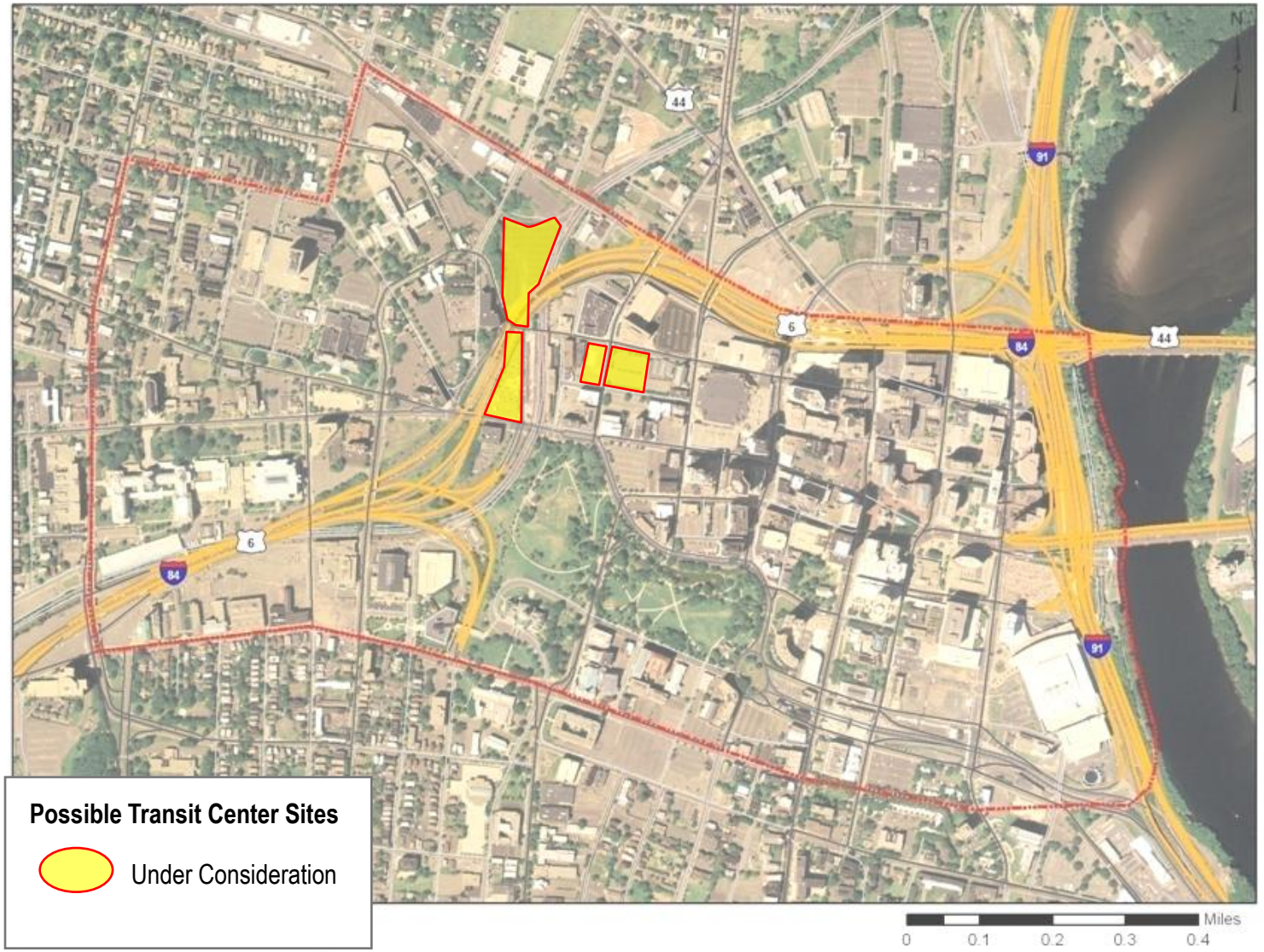
Disadvantages

- Lowest number of Transit Center transfers
- Highest number of transfers crossing streets
- High bus volumes on Main Street – especially northbound
- Largest increase in local bus operating costs
- Highest busway operating cost
- Poor connection between some west routes and both north and busway routes (via Capitol Avenue)
- Reduced access to Union Station
- Significant changes needed for the Star Shuttle to serve the transit center
- Increased local bus service on Central Row could affect commuter bus operations

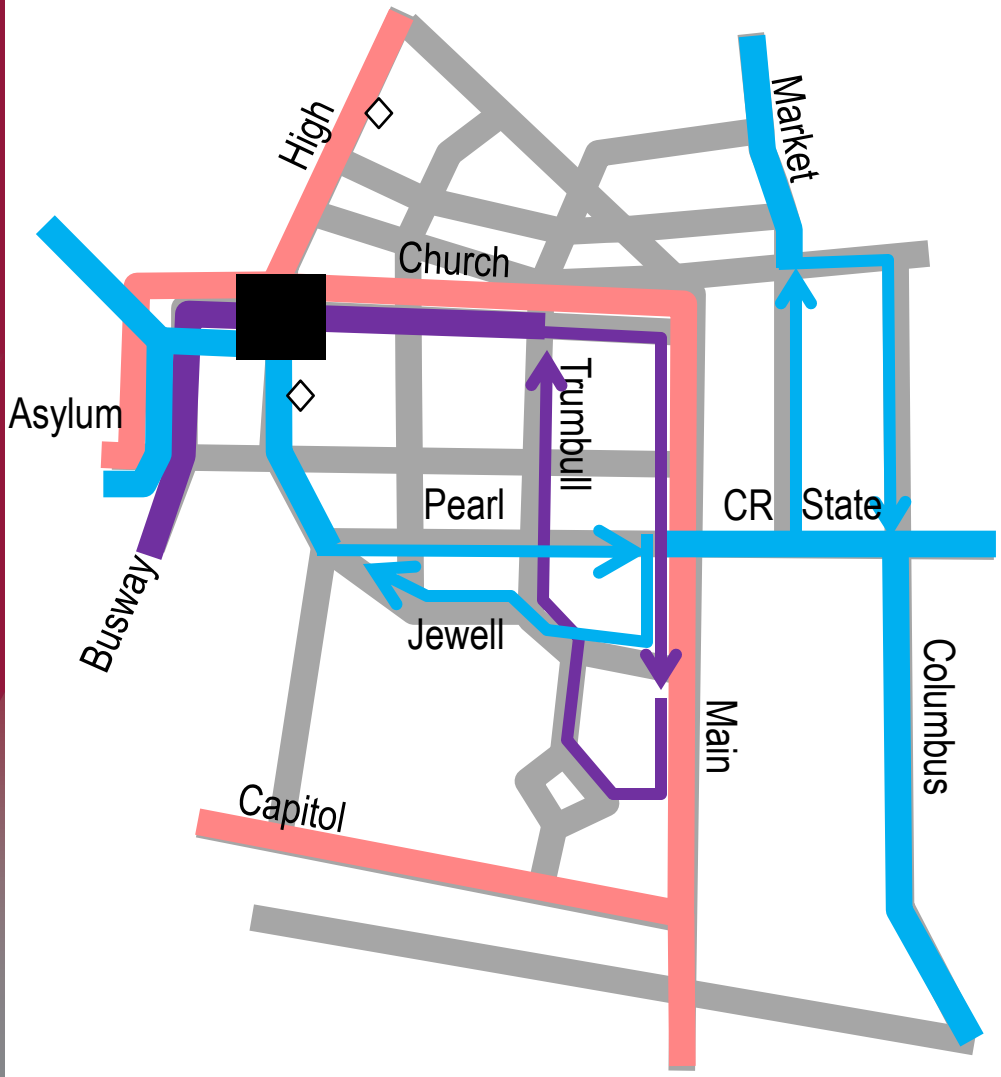
Alternative 2

- **Alternative 2** - Enhance service to the west side of downtown by developing a transit center at or near Union Station that would be served by most routes while maintaining a secondary hub near Main Street

Alternative 2 - Possible Transit Center Sites



Alternative 2 – Through Routing



North-South Routes
A, K, Q, T, U
NC (terminating)
P (terminating)

East-West Routes
E + B, YM, Z
F1 + WNM
F2 + O
SG + H
SW + G
WV + J
NW (terminating)
YS (terminating)

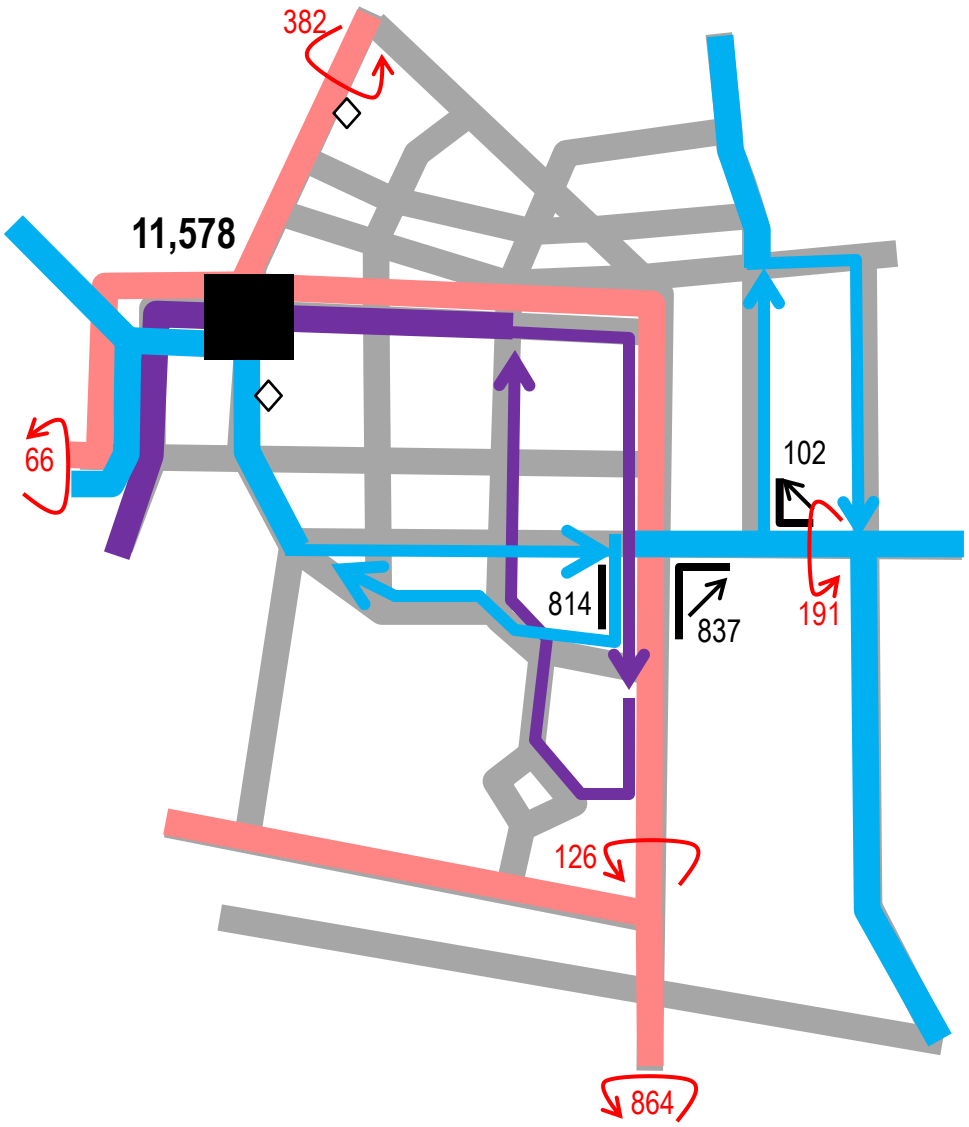
West Terminating Routes
Busway only

Transit Center

Contra-Flow Bus Lane

TranSystems

Alternative 2 – Daily Transfer Volumes



North-South Routes

East-West Routes

Busway Local Routes

Daily Transfers

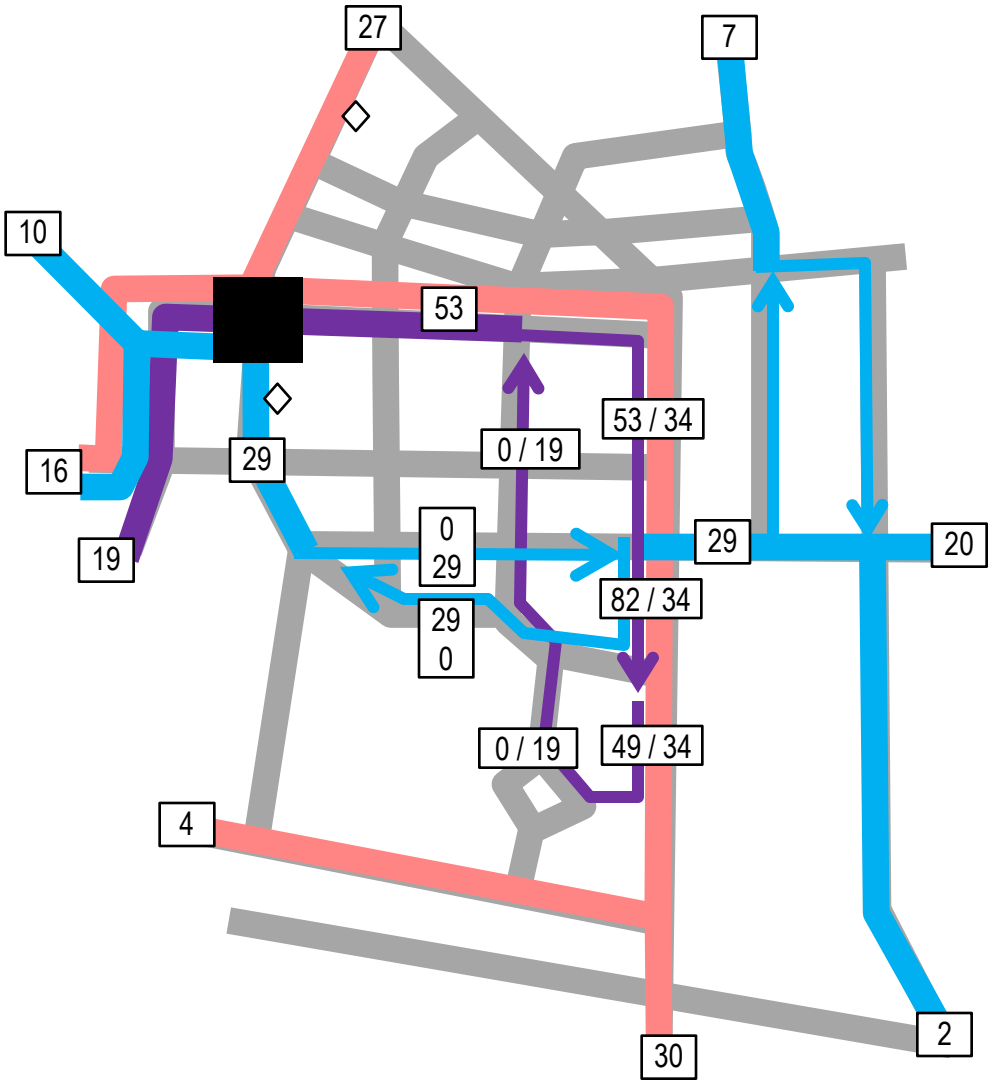
000 Crossing Streets

000 Without Crossing

000 Transit Center Transfers

TranSystems

Alternative 2 – Peak Hour Local Bus Volumes



North-South Routes

East-West Routes

Busway Local Routes

00
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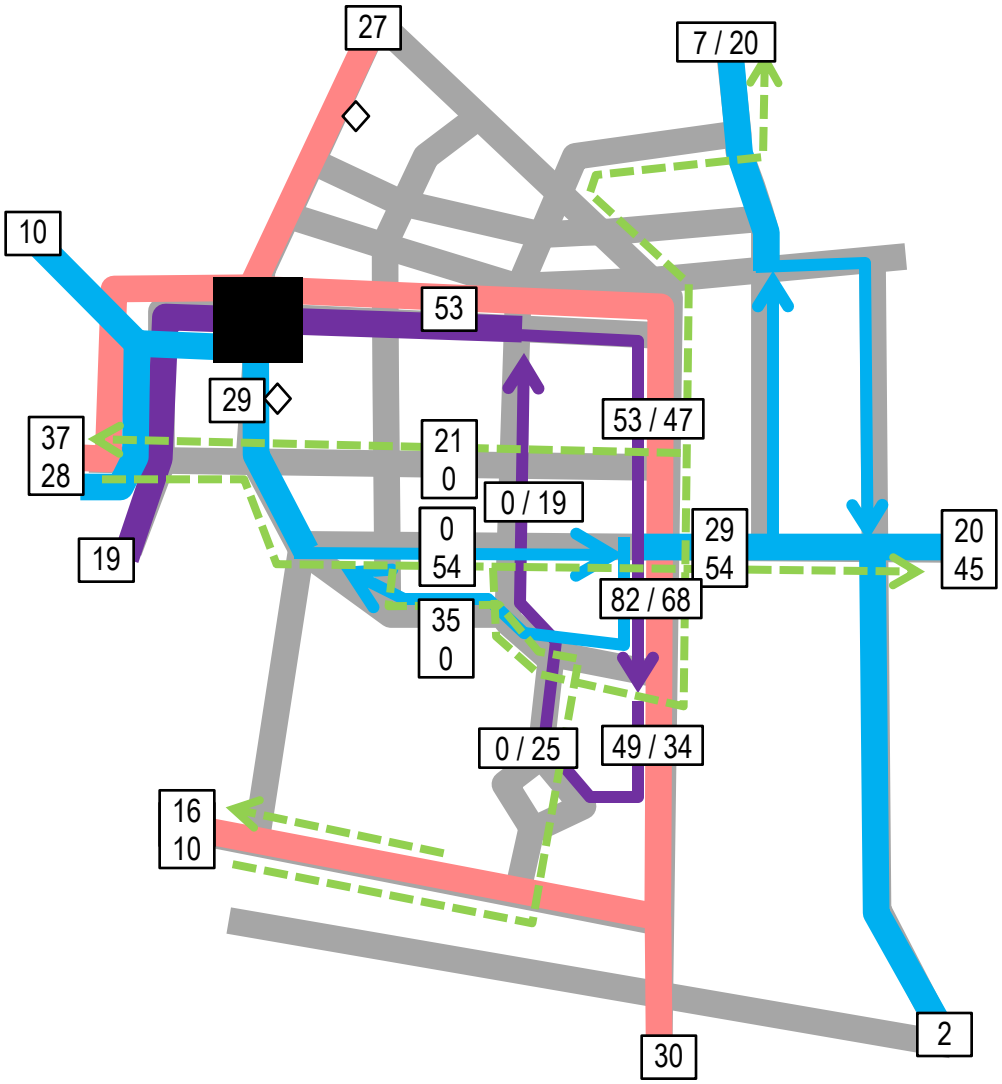
Peak Hour Local Bus Volumes
(for each side of the street)

TranSystems

Alternative 2 – Peak Hour Local and Commuter Bus Volumes



North-South Routes

East-West Routes

Busway Local Routes

PM Commuter Routes
(including busway express)

00
00

PM Peak Hour Bus Volumes
(for each side of the street)

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Alternative 2 – Transit Center Needs

- Access
  - Highest volumes to/from Church Street
    - Some could approach via Asylum/High for High Street sites
  - High approach volumes from Spruce/Myrtle Streets
  - North routes would be diverted from Main Street
    - via High for High Street sites
    - possibly via Edwards for Spruce Street sites (except K)
  - East routes would approach from Ford Street
    - via High for High Street sites
    - via High/Church or Asylum/Spruce for Spruce Street sites
- Capacity
  - 135 local buses (including busway) in peak hour
  - 11-16 bays for local service (most through-routed)
  - 3 bays for busway (non-terminating) – 1 for IB unloading, 2 for OB loading
  - Assuming no commuter buses or busway express

Alternative 2 – Initial Evaluation

Advantages

- High number of transfers in Transit Center
- Few transfers crossing streets
- Relatively low increase in operating costs
- Good connection between busway and both north and west routes
- Good connection between west and north routes
- Increased access to the east side
- Increased access to Union Station from all corridors

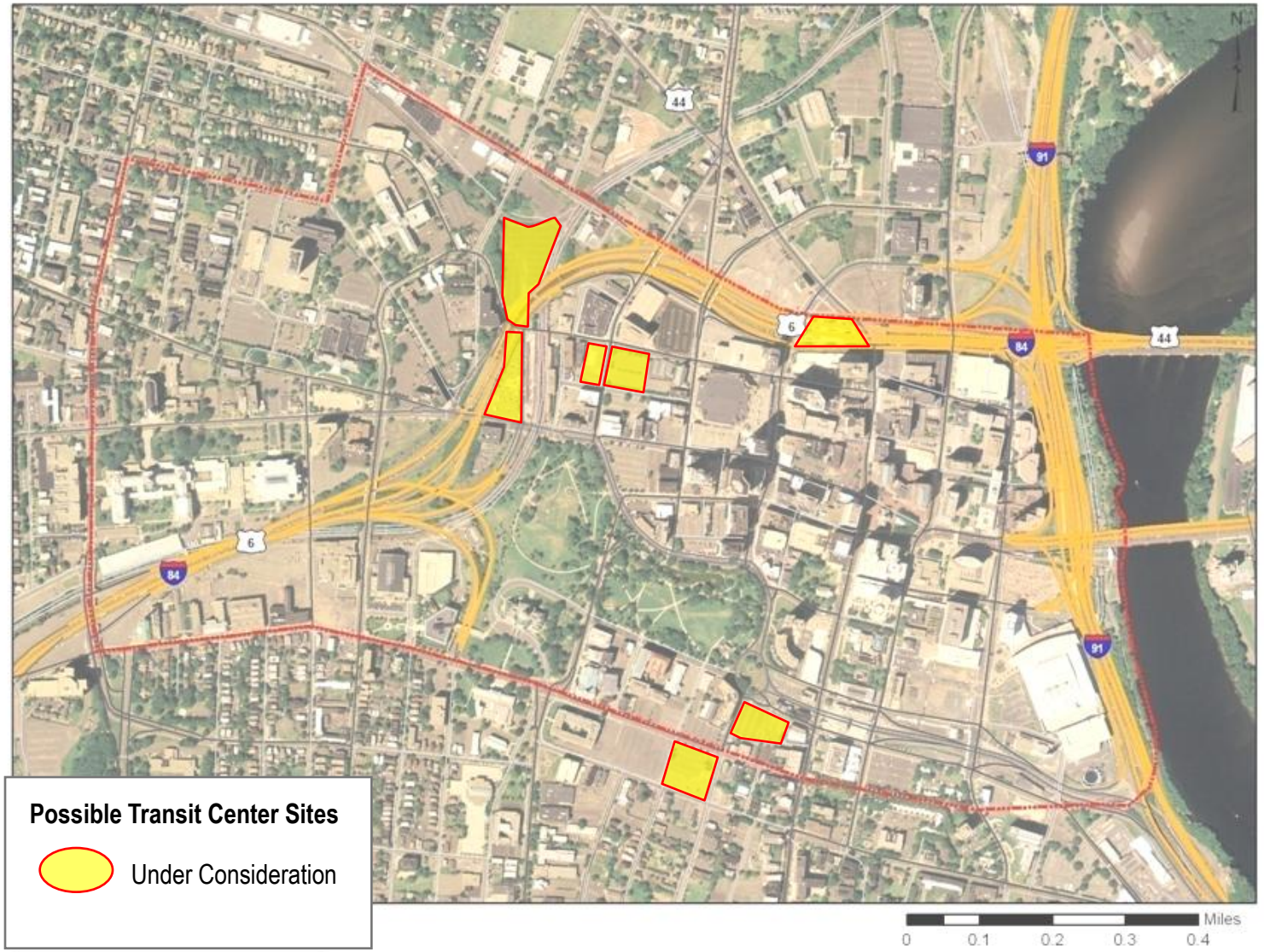
Disadvantages

- High bus volumes on Church Street
- Poor connection between east and north routes (via Union Station)
- Increased local bus service on Central Row could affect commuter bus operations
- Moderately difficult transit center sites
- Transit center sites may lack capacity and may need to be combined
- Traffic modifications (contra-flow lanes) needed on High Street

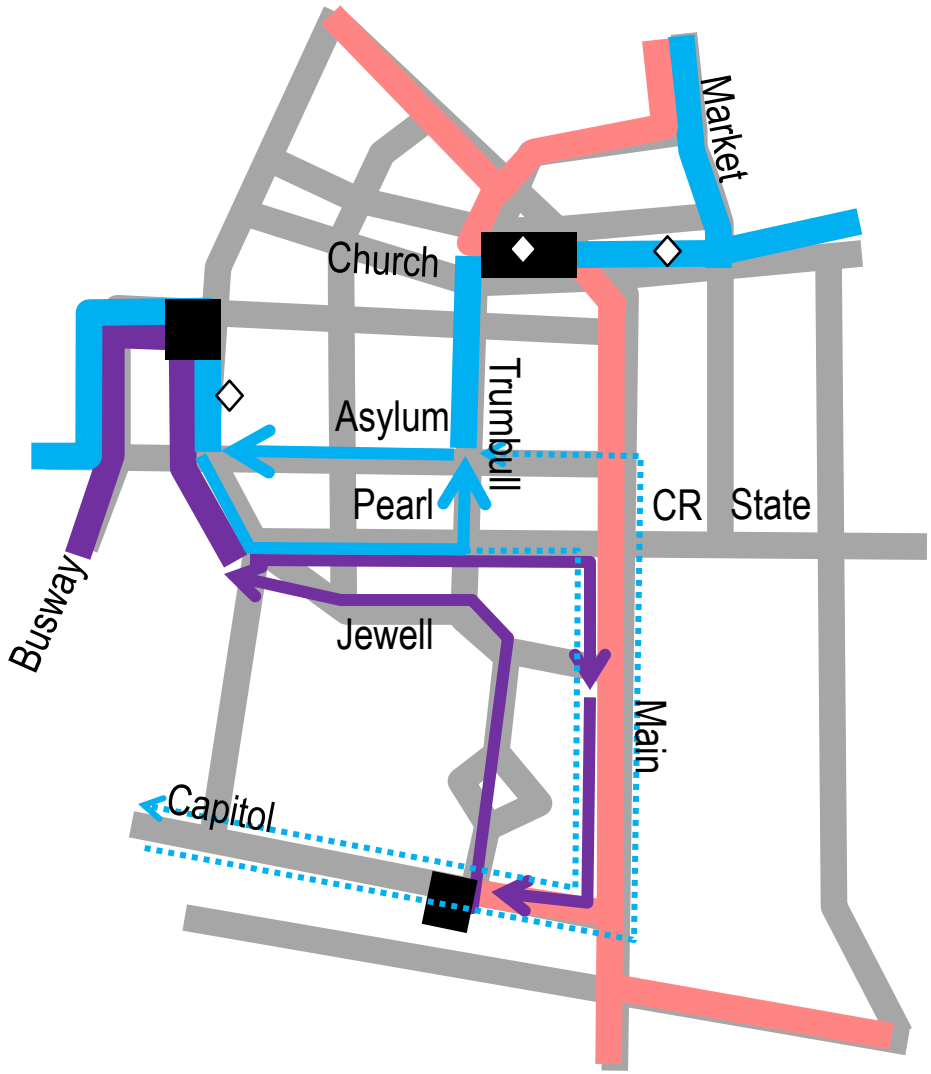
Alternative 3

- **Alternative 3** – Spread bus layovers among three smaller transit centers with each route serving two of the centers so that all transfer connections can be made

Alternative 3 - Possible Transit Center Sites



Alternative 3 – Through Routing



North-South Routes
K, N, Q, T, U
P (terminating)

East-West Routes
E + B, YM, Z
F1 + WNM
F2 + O
SG + G
SW + H
WV + J
A
YS (terminating)

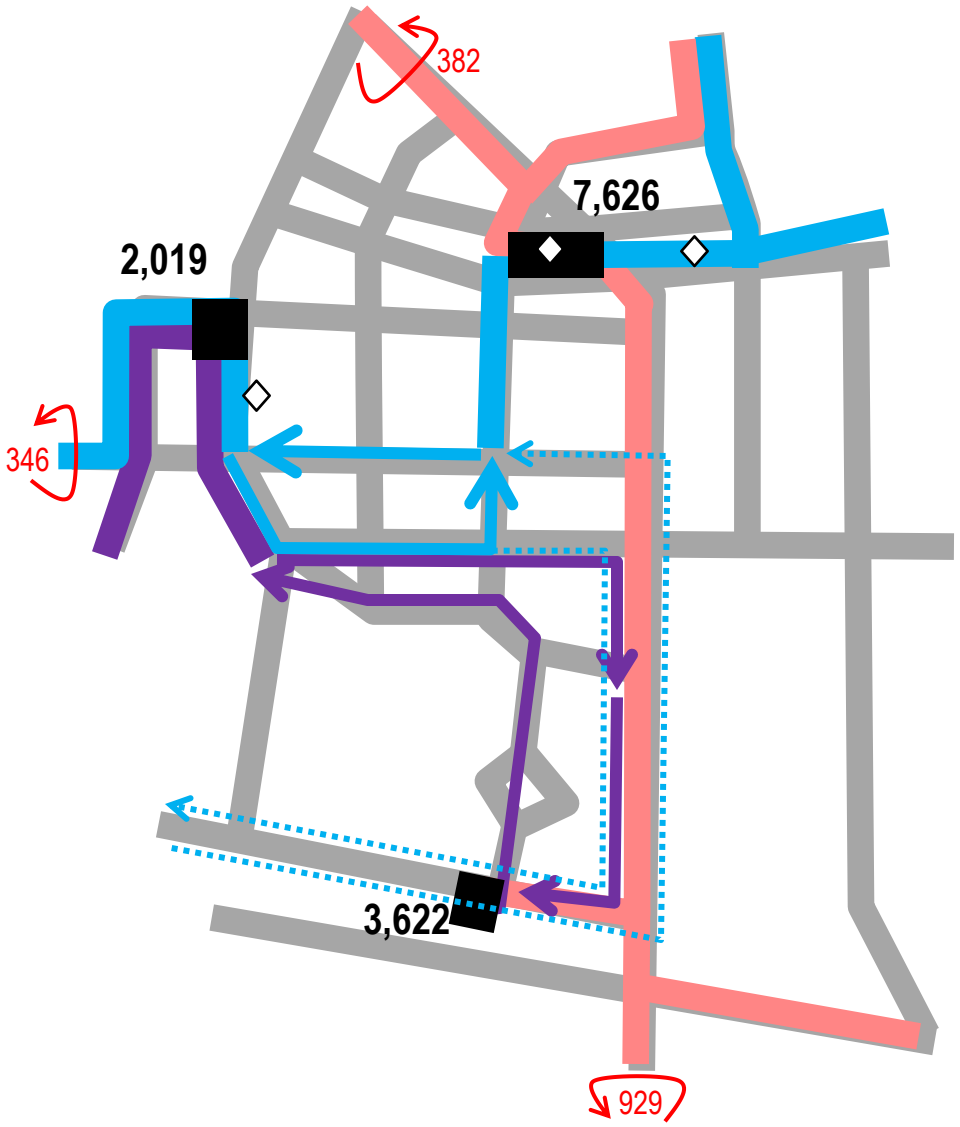
West Terminating Routes
Busway only

Transit Center

Contra-Flow Bus Lane

TranSystems

Alternative 3 – Daily Transfer Volumes



North-South Routes

East-West Routes

Busway Local Routes

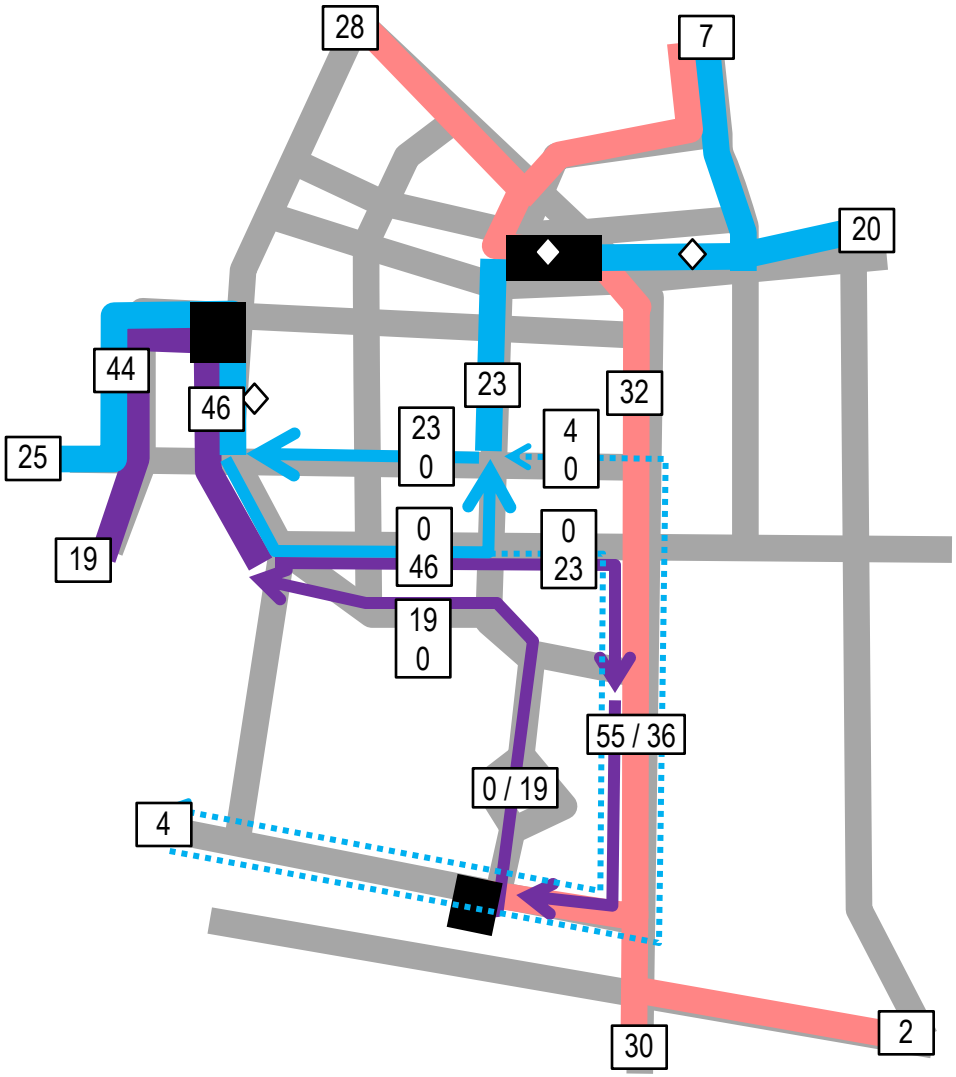
Daily Transfers

000 Crossing Streets

000 Transit Center Transfers

TranSystems

Alternative 3 – Peak Hour Local Bus Volumes



North-South Routes

East-West Routes

Busway Local Routes

00
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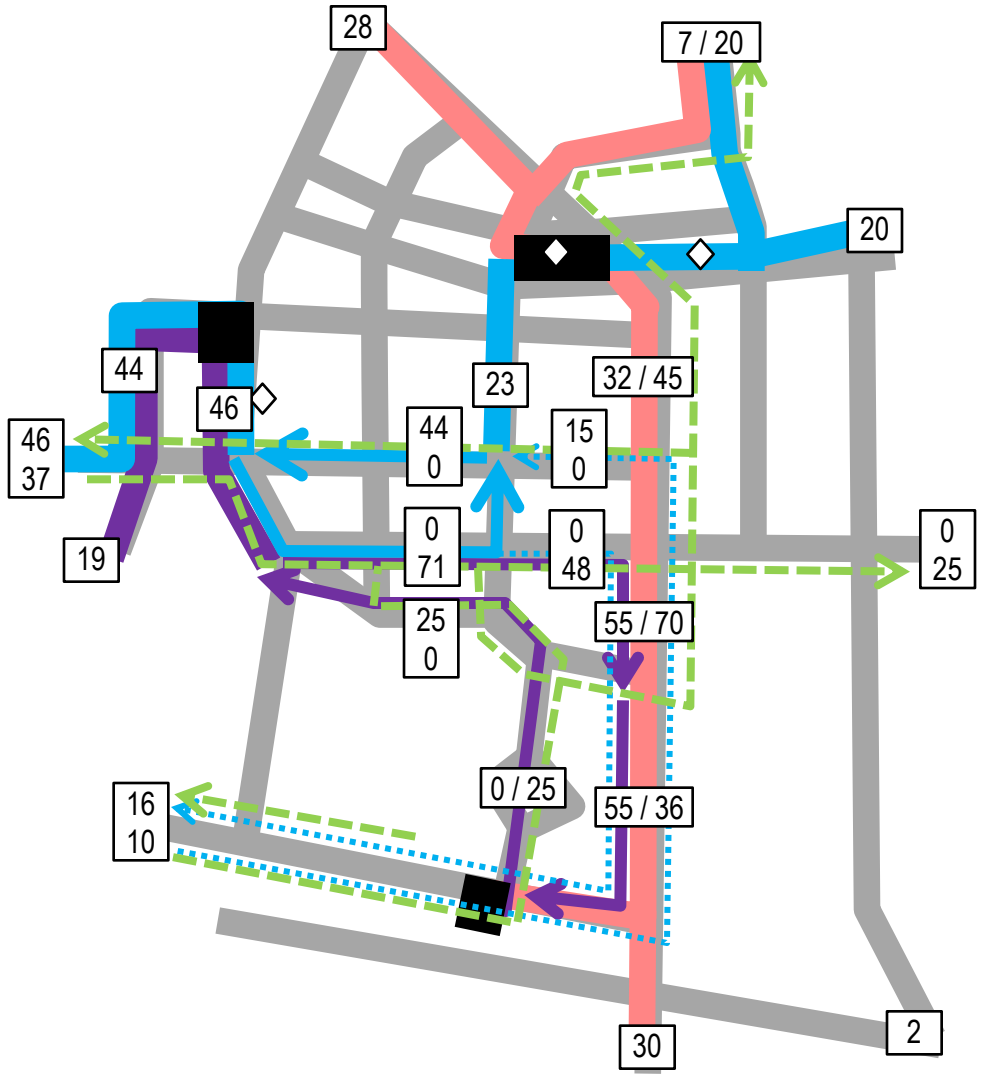
Peak Hour Local Bus Volumes
(for each side of the street)

TranSystems

Alternative 3 – Peak Hour Local and Commuter Bus Volumes



North-South Routes

East-West Routes

Busway Local Routes

PM Commuter Routes
(including busway express)

00
00

PM Peak Hour Bus Volumes
(for each side of the street)

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Alternative 3 – Transit Center Needs

- Access
  - Access to/from West and South Transit Centers as in Alternatives 1 and 2
  - Difficult access to I-84 site
    - requires contra-flow operations on Morgan between Trumbull and Main
    - north/south routes would enter via left turns off Main or Trumbull; exit via right turns
    - east routes may need additional contra-flow lanes for access
    - west routes would need left turn phase to cross Morgan/exit ramp traffic
- Capacity
  - Peak hour local buses and bus bays
    - South Transit Center 91 local buses - 7-12 local bays plus 3 for busway
    - Union Station 90 local buses – 6 local bays plus 3 for busway
    - North Transit Center 110 local buses - 10-15 bays
  - Assuming no commuter buses or busway express

Alternative 3 – Initial Evaluation

Advantages

- Highest number of transfers in Transit Centers
- Few transfers crossing streets
- Good connections between busway and both south and west routes
- Increased access to Union Station from the east
- Smaller transit centers may be easier to fit into the available sites

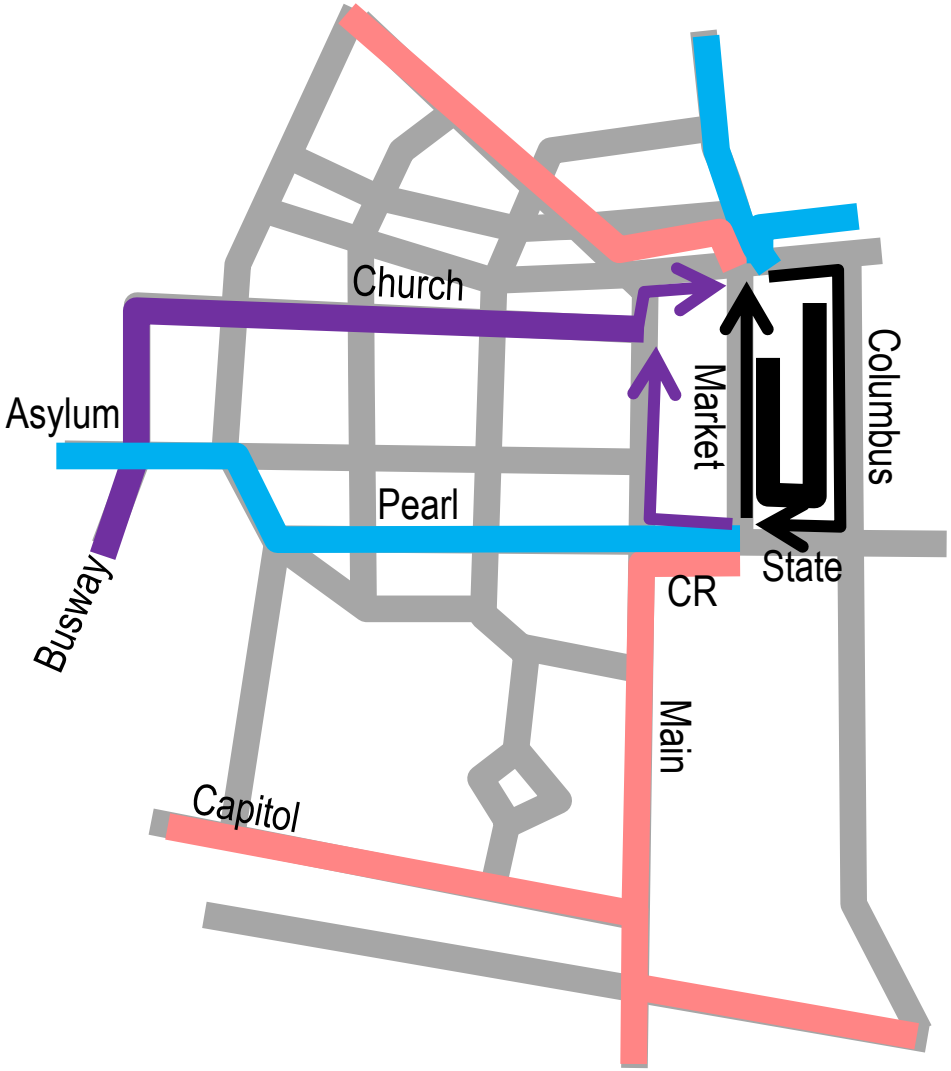
Disadvantages

- High local bus volumes on Pearl Street could affect commuter bus operations
- High busway operating cost
- Poor connection between busway and north routes
- Indirect connection between west and north/south routes
- East and west routes serve Trumbull rather than Main Street
- Reduced access to east side
- Significant changes needed for Star Shuttle
- Three transit center facilities are required
- I-84 deck site requires traffic modifications, is congested and may not be large enough
- Traffic modifications (contra-flow lanes) needed on High and Morgan Streets

Alternative 4

- **Alternative 4** – Minimize added travel time and mileage by maintaining a centrally located transfer point and developing an on-street transit center east of Main Street

Alternative 4 – Through Routing



North-South Routes
K, N, Q, T, U
SG + G
P (terminating)

East-West Routes
E + B, YM, Z
F1 + WNM
SW + H
YS (terminating)

Other Through Routes
A (south-west)
F2 + O (south-east)
WV + J (south-east)

West Terminating Routes
Busway only

All Routes

On-Street Transit Center

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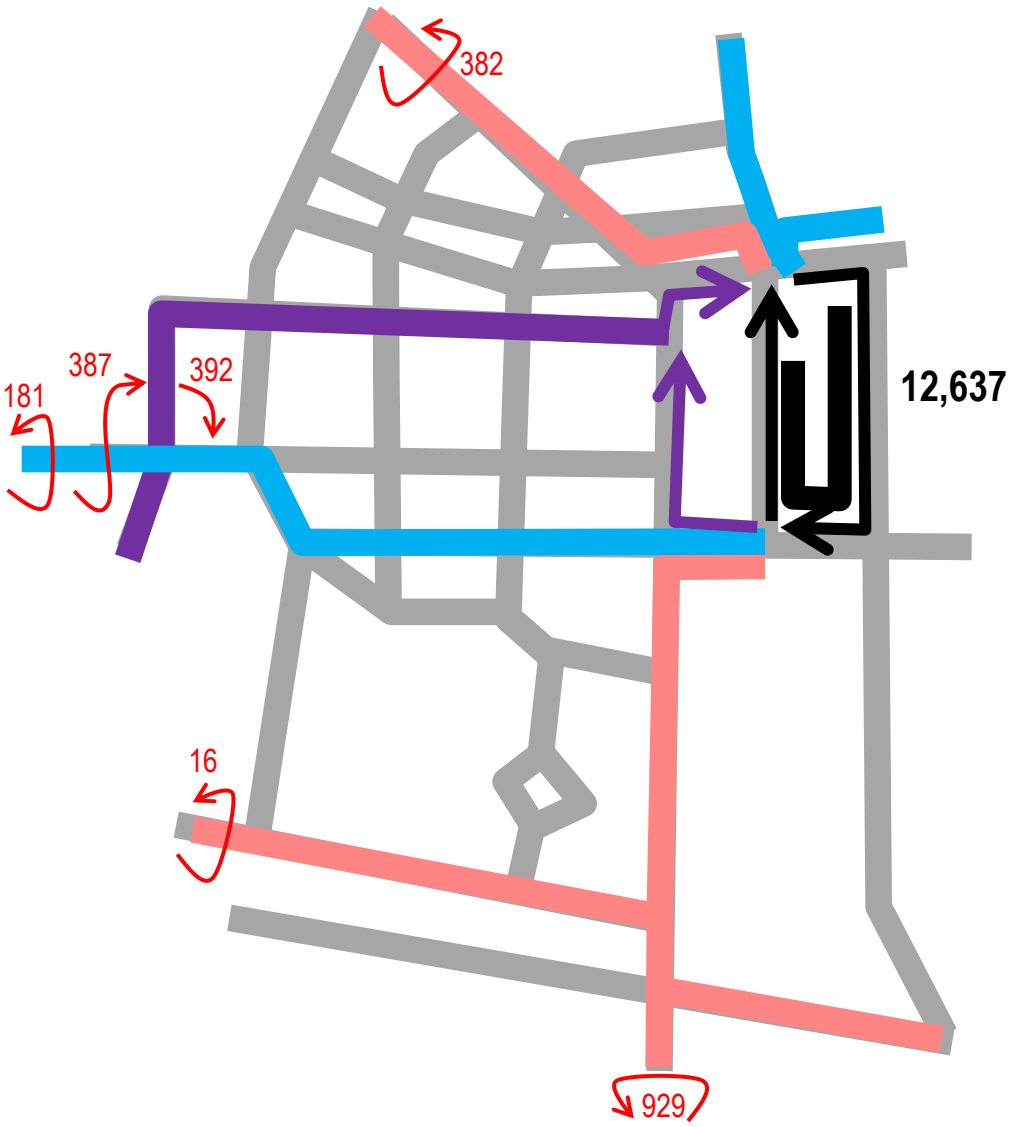
Alternative 4 – Daily Transfer Volumes



North-South Routes

East-West Routes

Other Through Routes

Busway Local Routes

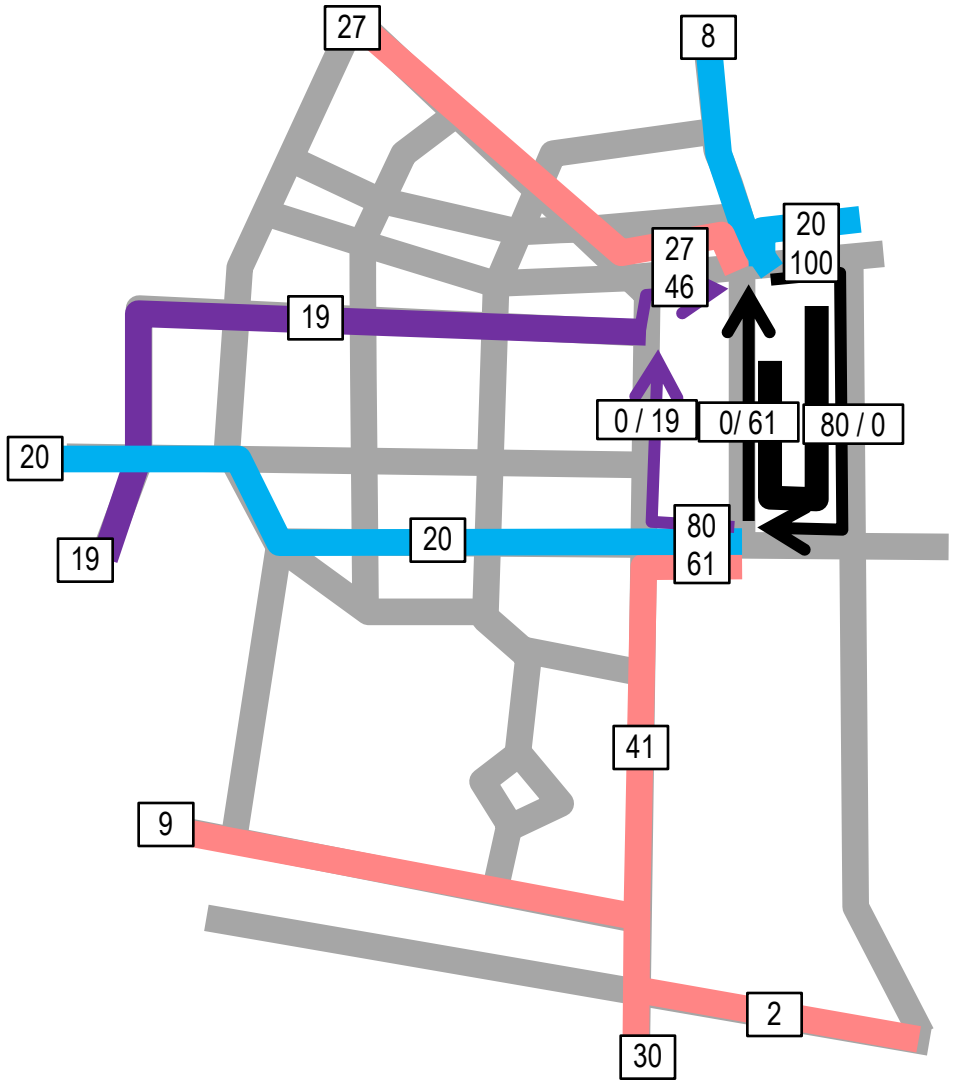
Daily Transfers

000 Crossing Streets

000 Transit Center Transfers

TranSystems

Alternative 4 – Peak Hour Local Bus Volumes



North-South Routes

East-West Routes

Other Through Routes

Busway Local Routes

00
00

Peak Hour Local Bus Volumes
(for each side of the street)

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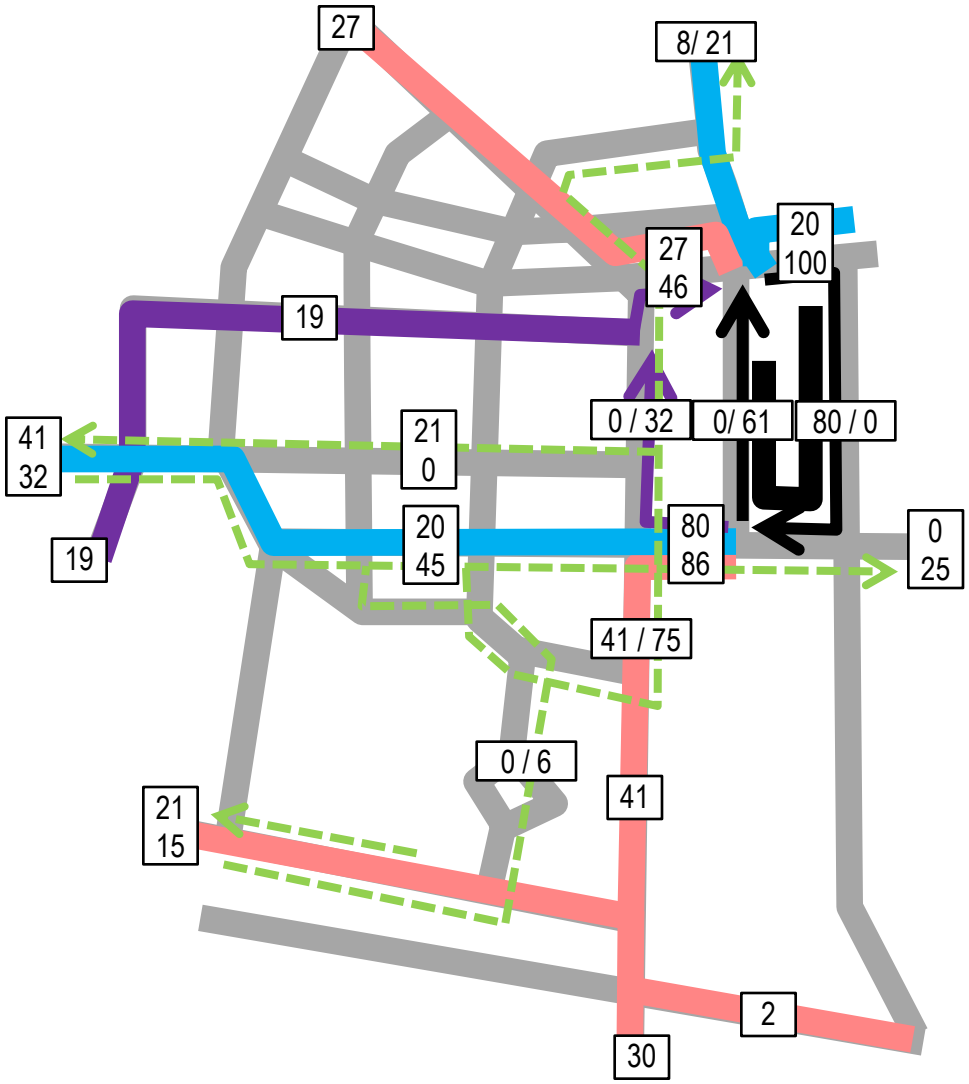
Alternative 4 – Peak Hour Local and Commuter Bus Volumes



North-South Routes

East-West Routes

Other Through Routes

Busway Local Routes

PM Commuter routes
(including busway express)

00
00

PM Peak Hour Bus Volumes
(for each side of the street)

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Alternative 4 – Transit Center Needs

- Access
  - Busway buses would loop along Main/Morgan/Columbus/State/Central/Main
  - South and west buses
    - approach via Central Row to Market and exit to Morgan to north or east
  - North and east buses
    - approach via Morgan to Columbus and exit to State/Central Row to south or west
    - access could be different if east and west routes are not through-routed

- Capacity
  - 135 local buses (including busway) in peak hour
  - 11-16 bays for local service split evenly between Market and Columbus/State
  - 3 bays for busway (terminus for eight routes) on Columbus
  - Assuming no commuter buses or busway express

Alternative 4 – Initial Evaluation

Advantages

- High number of transfers in Transit Center
- Nearly all transfers in a single location
- Relatively low bus volumes on Main Street
- Relatively low increase in operating costs
- Lowest busway operating cost
- Increased access to Union Station from the east
- Increased access to the east side from all corridors
- No changes needed to Star Shuttle
- Is not at all dependent on through-routing to minimize bus volumes

Disadvantages

- Longest distance between busway and north/south routes
- High local bus volumes on Central Row could affect commuter bus operations
- An on-street transit center may lack the convenience, amenities and operational benefits of an off-street site
- Traffic congestion around Market, Morgan, Columbus and State may make a transit center very difficult

5. Discussion and Input Regarding Evaluation and Findings

Evaluation of Alternatives (modified criteria)

- Utilization of Transit Centers
  - reduction in on-street and cross-street transfers
- Service to Through and Transferring Riders
  - Transfer convenience and directness
- Service to Riders into Downtown
  - travel time and diversions
- Service to Riders Traveling within Downtown
- Bus Volumes on Downtown Streets
- Traffic Issues and Circulation Changes Needed
- Operating Costs
  - Added cost of route extensions/modifications
  - Savings from increased through-routing
- Capital Cost
- Capacity and Quality of Transit Centers

Evaluation of Alternatives

	Alt. 1 (Main St.)	Alt. 2 (Union Station)	Alt. 3 (3 Centers)	Alt. 4 (East Side)
Utilization of Transit Centers	0	+	++	++
Through & Transferring Riders	-	++	0	0
Riders into Downtown	-	0	- -	+
Riders within Downtown	-	+	-	+
Bus Volumes	0	- -	-	-
Traffic Issues & Circulation Changes	+	-	- -	0
Operating Costs	-	+	0	+
Capital Cost	0	0	-	+
Capacity/Quality of Transit Centers	+	+	0	-

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Next Steps

- Select preferred alternative
- Develop recommended downtown service plan
- Incorporate recommendations into Union Station planning
- Draft and Final Report